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# Marches

By C. D. ROBERTS

*Captain, 7th Infantry  
Instructor, Department of Military Art*

(Talk on Marches Delivered to the Medical Class  
The Army Service Schools, April 2, 1914)

THE word "march" is probably derived from the Latin word "marcus," a hammer, and has always had a decidedly technical meaning as opposed to the common word "to walk."

"To march" implies the presence of numbers, the sinking of the individual into the crowd; but it implies, more than that, rythm, *order*, subordination of self. The hurrying crowds on the city streets do not *march*—they merely walk or shuffle along—every man for himself.

Now Field Service Regulations, paragraph 142, says: "A successful march, whether in peace or war, is one that places the troops at their destination at the proper moment and in the best possible condition."

"Good marching is secured by careful preparation, strict discipline, and the due observance of march sanitation." Of these three requirements, by far the most important is *discipline*. Without it, the troops are a mere crowd, a mob, a herd of cattle, a flock of sheep—no preparation, no matter how careful, does any good, march sanitation is a joke.

It is not my intention to go into the question of how to attain discipline; but we must bear constantly in mind that it is the one prime essential, the one thing that differentiates the soldier from the

civilian, that makes successful marches, camps and battles possible—without which training is of no avail. Discipline is largely a question of habit—it can only be attained by long and constant subjection to military rule and control. To be real it must be subconscious and unconscious. It is not a matter of form nor is it manifested in formal ways, though no better way of inculcating it has yet been discovered than accurate and painstaking close-order drill. Let us all realize the fundamental necessity of discipline and that there is no royal road to its attainment—no quick modern way of making disciplined soldiers. Indeed the American youth of military age is more than likely to have a contempt for authority and law that makes him a peculiarly difficult subject to bring under real discipline.

Now *discipline* does not imply *severity*—on the contrary, the better the real discipline, the less severity is needed. This is something especially to be noted under the head of marches. The same introductory paragraph of Field Service Regulations from which I have already quoted, states that the march is to be accomplished with the least possible hardship to the troops, and indicates ways in which this will be done, namely, by giving timely warning; by a special formation called “route order;” by cutting down weights to be carried; by allowing frequent rests, etc.

Field Service Regulations, paragraph 143, states in general what preparations are made for the march—the first thing being that men and animals are in fit condition.

The Infantry Drill Regulations, paragraphs 624-627, lays down rules for getting the troops in condition. It is hardly necessary to warn you gentlemen of the danger of attempting too much in this direc-

tion—especially with the young recruits. I will mention this again later.

As to equipment the fundamental question of footwear is too self-evident to require comment—and, please remember, Mr. Medical Officer, that the absence of proper shoes in the quartermaster storehouse, is as much a matter to go on the sanitary report as the fact that there are flies in somebody's kitchen.

In the field we must, it is true, generally take clothing and equipment as we find them, but the question of how they are worn and used is often open. For example, the effect of the pressure of the uniform coat on the neck is illustrated by the following incident that occurred in one of the Chinese wars: The 98th Regiment, British, "healthy and strong, having just landed, ascended the heights dressed according to regulation. The heat was intense and numbers of the men fell dead on the way from heat stroke. The 18th, 49th and 55th Regiments, equally exposed to the sun, but with their jackets open and *stocks removed*, did not lose a single man from this cause." (Physiology of the March, Journal Royal Un. Ser. Inst., Dec. 1910.)

The troops are prepared for and put in march by a *march order* (F. S. R. 144), which begins by giving the object of the march, follows with the distribution of troops (that of the main body usually in the order of march) and of the trains—with the necessary special directions to each—and ends with an indication of the place of headquarters or where reports will be made.

Ordinarily an *initial point* is selected which the various units successively pass at fixed times or in a fixed order. This is merely a matter of convenience and the actual words "initial point" rarely appear in orders. Yet the selection of this point is of considerable importance—it should generally be beyond all



the camps in the direction of the march, must always be a definitely fixed point and should be easily accessible to all units that have to pass it. Sometimes two or more initial points may be used.

The person writing the order and the subordinates who execute it must know (1) the rate of march and (2) the road space occupied by the various units.

In the problems given at these Schools we must necessarily assume standard road spaces and rates of march. In actual service, conditions of roads, weather, morale, discipline, numerical strength of units, etc., are constantly changing, which vastly complicates the problem of marching.

The routes of various elements to reach initial point should not be stated unless necessary to prevent the occurrence of confusion—this, however, will often be necessary.

In practice, a command in rear whose time of departure is dependent upon commands in front of it will have to send an information officer with a few orderlies to observe the progression of the movement and give warning of the exact time to start.

It is almost as much a fault to keep men unnecessarily standing in ranks as to be late at the initial point. Over-anxiety on the part of the commanding officer to be on hand at the proper time makes everybody nervous and unhappy and starts the day wrong. Jump the man that is slow in getting ready, but do not punish the whole command by requiring everybody to conform to the slowest. Again it is to be emphasized that *discipline* is the first essential in marching.

As to the distribution of troops—there are two general cases (F. S. R. 145):

(1) Marches in the presence of the enemy or *tactical marches*.

(2) Marches at a distance from the enemy—*route marches*.

In both cases the men are spared as much as possible, but in the former tactical considerations and in the latter considerations of *comfort* govern.

In tactical marches the main thing to be considered is how to get the troops from column of route into formation for action. The troops cannot march deployed (except in some rare cases of small commands, for short distances, in open country) hence the question resolves itself into one of distance and time. In general it takes a command at least as long to deploy as to march its own length. Hence in considerable bodies of troops the column is arranged from front to rear in about the order in which the troops will be needed in the kind of action anticipated; giving due consideration to the security of the column and especially of the more valuable units, such as artillery and trains.

Since the advantage in a meeting engagement is with the side which can get the most men into action first, the question of road space is exceedingly important. The basis of all combat is the infantry rifle and the basis of all road space is the approximate two rifles per yard of road in the route column (column of fours). The tactical commander must be and *is* exceedingly jealous of his road space. To cause him to give up, say, the twenty yards necessary for a gun, he must be shown very clearly that said gun is worth at that place in the column at least as much as the forty rifles displaced. If it is a reel cart or an ambulance taking up fifteen yards, it must be shown that its presence there is worth the thirty rifles that are crowded to the rear. The same vigorous test is applied to every auxiliary part of the military machine on the march. Hence, you need not be surprised in actual war time marches close to the enemy to see

many of the “trimmings” relegated well to the rear.

Do not start *too early*—6:00 a.m. in summer or an hour after dawn in winter is usually early enough. (F. S. R. 146.)

However, tactical or other considerations may compel an earlier start and anyway it is much better to break camp before dawn than to go into camp after dark.

In very large commands using only one or two roads, it may and probably will be necessary to keep the roads in use practically for the whole twenty-four hours—hence marches may often have to begin and end at any hour of the day or night—the staff routing the troops and trains over the road like a train dispatcher of a railroad.

The provision of paragraph 146, Field Service Regulations, that the hour for reveille and stables is prescribed the night before refers, of course, to separate camps,—such as of a brigade. If not done, some commanding officers will turn their men out too soon and disturb the whole camp—as well as unnecessarily fatigue their own command.

The police of the ground before departure is important and should become a regular habit. Because *we* leave a camping place is no reason why somebody else will not have use for it hereafter.

The rate of march for infantry in large bodies may be taken at two and one half miles per hour, including the hourly halts. (It is the same for the French and German armies.)

This is under favorable conditions of course. Omitting all halts, in deployments, the rate is three miles per hour. Mounted troops move faster, but in a mixed column the speed of the infantry of course determines that of the column.

Twelve miles is a good march for a division—especially if it has to close up at the end of the day's

march. However, a large command, such as a division, would rarely close up at the end of a day's march unless compelled to do so by tactical or other reasons. Ordinarily a large command, making a march of several days' duration will camp on a depth approximating its march depth, so that all the major fractions of the command can start and halt at about the same hour.

#### **Regulation of the March**

**HALTS.**—The first rule is that troops must immediately clear the road when halted—no matter how short the halt is to be. This rule applies to artillery, ambulances and trains as well as to infantry.

Paragraph 148, Field Service Regulations, prescribes that the long halt (an hour) is not usually made except when the days' march is such that it will run well into the afternoon.

The rule that the first halt is fifteen minutes can hardly apply except to small commands (or where distances between units are great—which amounts to the same thing). In order to prevent gaining and losing distance it will be necessary to prescribe in orders for large commands that halts will take place, say, from even hour to ten minutes after. (Some troops will have to halt in inconvenient places of course). This may be directed in the march order itself or in routine orders. If the latter plan is adopted, any departure from it (as to make halts longer or shorter, more or less infrequent) must be noted in the march order.

One side of road should be kept clear, if practicable, for messengers, etc. This is rarely practicable on our roads. Staff officers and messengers not on urgent business should try to use the time of the hourly halts (when roads are entirely clear) for rapid

movement, and avoid moving through column at other times.

By using motor cars and motorcycles this can be done in most cases.

The Germans have a bugle call of "clear the road"—which is used only by direction of officers. We yell "gangway"—which soon gets so common that nobody pays attention to it.

The long halt may at times be prescribed in advance—selecting places where wood and water are available. At times it may be possible to have this halt *by brigade*—at different points—each regiment to continue the march one hour after it reaches the halting place. This method will have to be very carefully arranged and regulated in order to prevent delay and confusion. A good watch is necessary and all watches must be set to official time.

If the troops are to cook at the long halt, wood should be provided in advance (except for small commands) as it takes too long to gather it. In the same way water may have to be provided in suitable receptacles if the only source of supply is wells and springs. If the water has to be boiled, still further difficulties occur—since the water boiling apparatus is usually back in the field trains. I am merely touching on the subject. You can see that these questions are all quite important and must be met. In our country, in war the question of money cost should not enter at all. Money is our one great war asset and it should be used with unstinted hand so as to offset as far as possible our military defects.

If company commanders are to give passes to all men who fall out, printed forms should be provided for the purpose. The medical officer should remember that not all men who fall out are malingerers. In fact, in well-disciplined commands, malingering is rare.

Crossings of streams, etc., must be reconnoitered in advance and means taken to prevent delays in passing. Men will naturally seek to keep their feet dry (and that is important, too, in preventing sore feet). Sometimes several crossings can be used at once and delay practically avoided. At all events these are matters for the staff to look out for.

If it is necessary to reduce front for any considerable distance it is better (in absence of tactical reasons) to make the entire march in narrow formation.

Mounted troops may often gain time and save fatigue to the infantry by making detours (around bad places in the road such as crossings)—their superior mobility enabling them to rejoin without delay.

If two marching columns must cross it is possible to do so without delay to one and with little delay to the other provided there is an open space near the crossroad.

On nearing the crossroad, the head of the leading regiment of Column B is halted and the regiment forms close line (of companies). When this is completed Column A changes direction enough to pass in rear of the regiment (or the regiment may be double-timed through an interval in the column). As soon as the regiment clears the road, which it does in mass, Column A takes the road again while the next regiment of Column B is forming close line. Column A is thus not delayed at all and Column B only a few minutes. I have my doubts whether this plan has ever really worked in actual service. However, it is theoretically possible and would be worth trying rather than wait for hours for a long column to pass. Mounted troops may use increased gaits to cross columns.

As the head of the column approaches the place for the camp, the *halt order* should be issued. In

small outfits it is generally issued at the end of the march when the troops are on the camp ground—the detailed orders for the smaller units (brigades and regiments) are always issued on the ground,

The halt order simply prescribes the places where the command will halt, who furnishes the outpost and on what general line and where trains go; sometimes instructions for supply of rations, etc., can be placed in the halt order—often this has to be embodied in a later order.

It is *imperative* to get troops into camp promptly. Nothing causes more discomfort and so reduces the confidence of troops in their commander as hesitation and unnecessary delay in going into camp. The staff must foresee everything and make all arrangements in advance. Orders should not infringe on the prerogatives of subordinates but must cover all points that superior authority ought to decide. The troops once in camp should not be moved except in case of imperative necessity.

All this points to a *brief* halt order.

CAMPING.—As to *camping*, the details of administration are extremely numerous. The rule is “*order all you can before reaching camp.*” Camps are made for rest and refreshment. Hence troops must be allowed to settle down as quickly as possible, to get them the preliminary work, so as to really be able to rest.

How this is accomplished is a fine test for the staff. The rule is that the less we hear about administration the better it is. This is undoubtedly disappointing to the loud-mouthed and self-seeking staff officer who wants to have his work known and admired—but it is nevertheless a fact.

It is wrong to give unnecessary orders, but more wrong not to give those that are necessary. For

example, divide the camp grounds (dont leave it to a council of commanding officers to do it).

In assigning camps the most usual fault is *crowding*. It takes a lot of ground for a division camp and even if the units are small, the camp space by no means diminishes in the same ratio as does the strength. Crowding greatly complicates supply of water, food, forage. It makes movement next day more difficult—it prevents proper rest, makes sanitary arrangements less effective and increases liability to contagious disease. Practically the only advantage where sites do not have to be rented is to put the whole command under the eye of the general, and perhaps to facilitate issue of orders.

Do not order "bivouac" unless it is necessary to do so. It takes but a minute or two to put up a shelter tent and less to take it down and when you say "bivouac" you prohibit use of tents of any kind. (F.S.R. 180.)

Time forbids any consideration of *billeting*. It will, however, pay an officer to read over the German and French field service regulations on the subject of billeting and supply (these subjects being practically inseparable in practice). We have used this method of sheltering troops in the past and will use it in the future in many cases.

Now a few words on the general consideration of marches and a few examples of marches.

Marches are so closely bound up with equipment, supply and sanitation that we can scarcely consider one without the others.

For example, the French retreat from Moscow—a classic case of a severe march resulting in the complete ruin of an army. But how much of the loss was due to faulty supply, poor equipment, bad administration, above all to the poor physique of the



men in the ranks when exposed to the severity of the Russian winter?

We all know the excessive absenteeism in the armies, both Northern and Southern, during our Civil War—especially at times during and after severe marching. Compare for example, the strength returns “present for duty” and “absent” of the Army of the Potomac and the Army of Northern Virginia at the time of Antietam. But how much of this absenteeism was due to other causes than marching?

In most cases the marching was merely an excuse. Discipline is a great reducer of fatigue. Lee, before Gettysburg, is said to have lost twenty-five per cent of his force by straggling. His loss in the battle was about twenty-three per cent.

It is well to remember that it is often better to sacrifice men in battle rather than ruin them by marching. As Colonel Morrison well says, the individual man would probably prefer being shot to being marched to death.

In reading of the marches made in old time campaigns we must remember that the troops were (except in case of oversea expeditions) invariably brought to the theatre of war by marching. Hence they were at the outset, hard and accustomed to marching. At present troops are concentrated by the speedier means of rail or steamship transportation and are pretty apt to start out soft. The staff officer has to remember this, and not figure that troops can jump at once into long marches. When time is not vital (and it will not be so in most of our wars) it would seem to be a good plan to execute some of the concentration by marching—to get the larger units well shaken down and ready for business.

The so-called hardening process will not be sufficient. Indeed that can be easily overdone—march-out from camp and back to camp is a make believe

that soon tires the soldier beyond measure. But put the command on the road with a fixed destination and an object in view and matters change at once.

Peace time hardening with us is largely a fallacy. When war occurs we must always fill our ranks with recruits. They have then to be hardened and the old men are hardened over again.

Colonel Morrison says "harden only when necessary and then *gradually*."

Even the Germans with their peace-trained troops recognize this. (Ger. F.S.R. 332.)

It seems to me that *esprit de corps* and *discipline* are the best preparations for marching—as well as for battle.

However, the officer must remember:

- (1) He has less to carry than the enlisted man.
- (2) He generally has better food and clothing and more comforts in camp.
- (3) His physique is usually better.
- (4) He is older, better educated and should have more stamina than the enlisted man.

Push the soldier to the *utmost* when necessary—but the real necessity seldom occurs, even in war. A good workman does not smash his tools *in getting ready* to do a job of work.

NIGHT MARCHES.—These hardly ever spare the troops (except in case of small commands under special conditions).

If troops can rest by day they can march at night with comfort. But a crowded, hot bivouac is not a good place to rest—especially for the enlisted men on whom the physical burdens of the march falls most heavily.

For strategical and *tactical reasons* night marches must be made. If more than one division advances on the same road, night marches for part of the command become necessary.

As before stated, in large armies marches must be made regardless of hours. This is a matter of course and cannot be avoided. Hence, we must know how to make night marches. There is an excellent series of articles on Night Operations in the last Journal Mil. Ser. Inst. (March 1914.)

Many of Napoleon's marches were phenomenal. This facility in marching was largely due to the fact that the troops were always camped in depth except when it was necessary to concentrate to fight.

For example—during the 1796 campaign in Italy, Massena's Corps marched one hundred miles and Angereau's 114 miles in six days. (Yorke I, 79.)

In August, 1813, the Guard Corps enroute to Dresden marched ninety miles in seventy-two hours. (Yorke II, 293.)

In 1805, Friant's Division marched from Presburg to Austerlitz, ninety miles, in two days and fought on the third day.

Davout's Corps from Oct. 7th to 12th, 1806 (Jena Campaign), marched one hundred and twenty miles in six days. (Journal de Sciences Militaires, July 1911.)

During the last war with the Boers the British are credited in the German "Official Account" with some excellent marching.

As an example of the result of a hard march on green troops, the 7th Infantry Division on Feb. 11, 1900, marched sixteen miles between 7:00 a.m. and "toward evening" during great heat and scarcity of water. Quoting from the Gen. Off. Account I, 140, "The 15th Brigade alone had twenty-one deaths, and nearly half of the men had fallen out. The division required some days to recover from the march which had been all the more exhausting because the men had come straight from being on board ship and in the train and were therefore quite out of condition."

(The 15th Brigade had 3878 men, of whom about 2100 were reservists.)

To show what seasoned troops could do under similar conditions, the following are cited: On Feb. 17-18, the 9th Division marched thirty-one miles in less than twenty-four hours (to Paardeberg) and in spite of short rations and great heat there were very few stragglers. (Gen. Off. Ac., 167.)

About the same dates the Naval Brigade with eight heavy guns made the thirty-one miles in twenty-three hours. (I-98.)

The 14th Brigade and three batteries made the same march (from Jacobsdaal to Paardeberg) between 9:00 p.m. Feb. 18th and 5:00 p.m. Feb. 19th.

Lord Roberts and staff rode this distance in six hours.

These marches were to engage in the action with the Boers going on at Paardeberg—a very important consideration, as the sound of the guns is a remarkable stimulant.

Later in the same campaign the Brigade of Guards marched forty-two miles, to Bloemfontein, in twenty-six and three-fourths hours (II-40).

These examples are interesting, but I warn you from generalizing from them or other examples, without a thorough study of *all* the attendant circumstances, a matter requiring a lot of difficult original research in each case.

Above all things we ought to avoid the present common method of winning cheap fame by comparisons of selected marches of foreign troops, with the supposed shortcomings of our own in this regard.

As a further example of marching—Jackson's Valley Campaign, 1862—according to Henderson (I, 425, etc.):

April 29—June 5, in thirty-eight days marched four hundred miles and fought three successive bat-

tles—several of the marches over twenty-five miles per day.

On the retreat from the Potomac they made one hundred and four miles in seven days—fifteen miles per day without a rest day.

Considering the undisciplined troops, inexperienced officers (of the headquarters, only Jackson and his Chief of Artillery had over one year's service) and the terrible roads and lack of good shoes, these marches were most excellent.

It was by no means all forced marches—in fact Jackson was always saving his men when it was possible.

From March 22d to June 25th Jackson's command made forty-eight marches, totaling six hundred and seventy-six miles—or an average of fourteen miles per march. (Henderson I, 403.)

In the second Manassas campaign Jackson's Corps marched over fifty miles on Aug. 25—27 (around the Union left to Manassas Junction).

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An example of a march during the Mexican War. *March of Wool's Division* from San Antonio, Texas, to Saltillo, Mexico, 1846. (From memoir by Capt. Geo. W. Hughes, Top. Engrs.)

*Composition of the Division:*

- 1 Field Battery 6 guns (Capt. Washington).
- 2 Guns (captured from Mexicans) manned by Volunteers.
- 1 Squadron 1st Dragoons.
- 1 Squadron 2d Dragoons.
- 1 Regiment Arkansas Cavalry.
- 3 Companies 6th Infantry (1 Co. Kentucky Infantry attached).
- 2 Regiments Illinois Infantry.

Detachment Engineers with Ponton Train.  
Strength—3400 men.  
Usual staff (regular) attached.

The battery had marched from Carlisle, Penn.; Dragoons, 6th Infantry and Arkansas Volunteers from Arkansas; Illinois Volunteers from Port Lavaca, Texas—so all were hard experienced in marching.

Assembly completed in August, 1846, at San Antonio, Texas.

Country almost unknown, no maps and practically no information obtainable, "in consequence of which" as Capt. Hughes says, "we were almost literally compelled to grope our way, and, like a ship at sea, to determine our positions by use of astronomical observations." Topog. parties were generally sent ahead of the troops.

Wool's Division left San Antonio September 28th, and marching by the old "Woll Trail," across upper waters of the Frio Leona and Nueces, reached the Rio Grande near Presidio de Rio Grande, one hundred and sixty-four miles, in eleven days (including halts).

The further marches are as follows:

Rio Grande to Sta. Rosa—105 miles.

Sta. Rosa to Monclara—77 miles (five marches).

Monclara to Parras—181 miles (eleven marches).

(The command except Illinois Volunteers had then marched nearly 2000 miles.)

Parras to Agua Nueva—100 miles in four days (to the relief of General Worth).

The division arrived at Agua Nueva in excellent condition and ready for any service. It bore a prominent part in the battle of Buena Vista.

It is almost useless to compare marches made under European conditions with those made in America. General Sheridan accompanied the Prussian head-

quarters during most of the Metz and Sedan campaigns and says: (Memoirs II—451.) "It must be borne in mind that campaigning in France—that is the marching, camping and subsisting an army—is an easy matter, very unlike anything we had during the war of the rebellion. To repeat: the country is rich, beautiful and densely populated, subsistence abundant and the roads all macadamized highways; thus the conditions are altogether different from those existing with us. \* \* \* I can but leave to conjecture how the Germans would have got along on bottomless roads—often none at all—through the swamps and quicksands of northern Virginia, from the Wilderness to Petersburg, and from Chattanooga to Atlanta and the sea."

Sheridan was an excellent critic fresh from his experience in the Civil War. His words must be given more weight than those of some of our new fledged military experts whose knowledge of war is confined almost entirely to foreign books and to whom our own military history is unknown.

As a staff officer, beware of making too many rules and regulations for the command—the Army and Drill Regulations and Field Service Regulations contain, as a rule, nearly all that is necessary. The practice of each commanding officer getting out several volumes of orders covering every possible phase of administration as soon as his command is assembled, may show how much he and his staff know, but even if they are printed in convenient and legible form, it is hard to get people to read these long orders and harder yet to make them respect and obey them. The American people by no means have the Chinese respect "for the printed word." It is suggested (though with some diffidence) that it is better to *assume* a knowledge of the Army and Field Service Regulations and *soak violators* than to republish the

whole business with annotations by the adjutant, surgeon, quartermaster, etc.

This tendency to issue long and tiresome orders which are most extracts from or paraphrases of regulations of superior authority, is by no means a new thing in our service as the following extracts from a letter of George Washington to one of his division commanders will show:

To Lord Sterling,  
(Private)

Morris-Town, 5 March, 1780.

My Lord:

I have read the orders, which you had framed for your division. They are certainly good; but in substance, except in a very few minutes, are very explicitly enjoined by the regulations, and have been reiterated at different periods in the general orders, antecedent to the promulgation of the established "Regulations for the Order and Discipline of the Troops" and since in many particular ones by a reference to them; as your Lordship may perceive by recurring to the Orderly Book. At our last interview I slightly touched on this subject; but I shall embrace the present occasion to repeat more fully, that orders, unless they are followed by close attention to the performance of them, are of little avail. They are read by some, only heard by others, and inaccurately attended to by all, whilst by a few they are totally disregarded; and this will forever be the case, till the principal officers of the army begin the work of reformation by a close inspection into the police, the conduct of the officers, and men under their respective commands, and will endeavor to restore public economy and saving, than which nothing can better suit our present circumstances. It is idle to suppose, under a description like this, ye ground for which none I believe will deny, that a division, brigade, or regimental order, will have greater weight than those of Congress, or yr. Xc.; but if the persons issuing them would devote, as duty indispensably requires, a reasonable portion of



their time to a personal and close inspection into the affairs of their respective commands; would frequently parade their regiments, and compare the actual strength of them, their arms, accoutrements, and clothes, with the returns, and have the deficiencies, (if any there be) satisfactorily accounted for and provided, agreeably to the establishment of the army; would see that the regulations, the general orders, and their own, were carried into execution, where practicable, or report the causes of failure when they cannot; that all returns are made in due form, in proper time, and correctly, comparing one return with the other, in order to prevent mistakes, correct abuses, and do justice to the public; and that in visiting such parts of the line, and such particular corps, as are entrusted to their care, praise is bestowed on the deserving, reprehension, and (where necessary) punishment on the negligent; the good effect would be almost instantaneously felt. Frequent visits and inspection into matters of this kind would produce more real good in one month, than volumes of the best digested orders, that the wit of man can devise, wd. accomplish in seven years.

(Ford, Writings of Washington, 8,209-12.)

Washington may not have been a very brilliant general, but he was second to none in his experience and knowledge of American Character.

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It is my opinion that all staff officers (including medical officers) should have a course of training in actual marching on foot. In no other way will they really appreciate the strain of what the Infantry Drill Regulations (paragraph 623) well calls the "principal occupation of troops in campaign."

The soldier is one of the most expensive necessities. Each of our Civil War soldiers has cost us about \$10,000. It is certain that soldiers have not grown any cheaper since the Civil War. Hence it is easy to see how an incompetent officer may in a

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single poorly conducted march cost the government more than his service would be worth if he stayed on the active list for a hundred years. And this is merely in dollars (with which the country is, at present, abundantly supplied.) There are many more valuable things than money and one of them is *morale*, the loss of which by poorly arranged marches may be fatal.

# The Medical Supply Department of an Army

By JAMES F. HALL

*Major, Medical Corps*

**T**HE Medical Supply Department of an army under war conditions is brought face to face with a problem of great magnitude, and upon the success with which this duty is carried out depends in large measure the final success or failure of the arms. If we assume a conflict between two forces, equal in numbers and efficiency, with the exception that one is crippled by having an inferior medical supply department, it is safe to say, that other things being equal, the force which has failed to solve the problem of properly distributing its medical and hospital supplies and equipment will meet with disaster. It is one thing to furnish the various medical supplies to troops in garrison in time of peace, but it is quite another matter to meet the requirements of troops under the chaotic conditions of active warfare. In the one case, the supplies follow a formal and well-ordered plan of distribution, based upon regulations, and issued upon approved requisitions; in the other case, the exigencies of the situation may be such that the supply officers and their assistants may be taxed to the limit of their resources to effectually distribute the medical supplies and equipment in such a way as to place them within reach of the large numbers requiring them.

In order that this work shall be carried out efficiently when the time of stress arrives, it is of importance to make preparations ahead in time of

peace, accumulating such articles as can not readily be assembled at the last moment, and laying down rules and regulations which shall serve as a guide for the personnel into whose charge these articles are to be placed.

If we will glance at the sanitary conditions attending our various wars, we will be struck by the fact that in no instance have our preparations been equal to the demands made upon us. In spite of the gruesome lessons which were taught, little progress seems to have been made towards correcting the deficiencies which would prevent their recurrence at each subsequent outbreak of hostilities. One might think that after the terrible experiences of the Civil War, immediate steps would have been taken to so provide for an efficient sanitary service of supply that a repetition would not occur at any later period. At the outbreak of the Spanish-American War however, these things had all been forgotten, and when our troops took the field, there was the same shortage and lack of previous organization for the successful handling of medical units, supplies, and equipment, that had always existed. In all justice it should be stated that this failure is not to be charged to the medical department alone; Congress, in its familiar habit of trusting to the future, refused to appropriate the necessary money to permit of accumulating the required reserve supplies, with the result that medical equipment and articles of all kinds required by sick and wounded soldiers were woefully lacking and had to be assembled as best they could on short notice, trusting largely to luck on their reaching their destination in time to serve any useful purpose. Fortunately, it can be said, that a different policy now prevails. Congress is no longer so niggardly in the matter of Medical Department appropriations. Acting upon the recommendations of

the Dodge Commission "that a year's supply for an army of at least four times the strength be held constantly on hand" and that "the Medical Department have charge of transportation to such an extent as will secure prompt shipment and ready delivery of all medical supplies," the Surgeon General has been able to secure from Congress such appropriations as to enable him to accumulate a reserve supply of Medical Department property that will be of the greatest value in case of a sudden call to arms. There are now on hand in the United States a complete reserve equipment of Base Hospitals, Evacuation Hospitals, Field Hospitals, Ambulance Companies, Reserve Medical Supplies, and Regimental Infirmaries, for ten divisions of troops. There is also a complete outfit held in reserve for one division in the Philippine Islands and another in Hawaii. These field units, each complete in itself, according to Medical Department regulations, are kept intact and are stored at various supply depots ready to meet the call of any emergency. The recommendation of the Dodge Commission relating to transportation is a very important one, and unless the Medical Department is assured of having charge of its own transportation, there is no certainty of its supplies being delivered on time. A divided responsibility may give rise to no end of trouble, and the Medical Department may be placed in the position of being unjustly criticised for the delinquencies of another department. The Medical Supply Officer in whose charge these field units are placed, should be authorized to secure the necessary railroad transportation to ship them direct to their destination without any reference to the Quartermaster Department. In times of emergency, when it is important that all medical supplies and equipment should be delivered as quickly as possible, the Quartermaster Department, being already

overburdened with requests for the shipment of enormous quantities of supplies, may not be able to handle the medical supplies as quickly as would an officer of the Medical Department who would feel a personal pride in the quick despatch of the various articles belonging to his own department. With the supplies so sent should be a reliable sanitary soldier whose duty would be to report immediately the arrival of this invoice to the officer to whom it might be consigned. This arrangement would obviate the possibility of having these important shipments become sidetracked and lost. From this point if other transportation is not readily available, the wagons belonging to the Ambulance Companies, Field Hospitals, or Reserve Supply, could be used for removing medical property from trains.

The process of accumulation of supplies should go on continually, care being taken that money is expended for this purpose only for those articles which are difficult to procure in times of war. A fact which may appear strange at this day is that many medical supplies were ordered in 1898 that were not delivered until after the close of the war. In the German sanitary supply depots there is an extensive service carried on. The chief sanitary depot is in Berlin and is a large four story structure. Enormous quantities of gauze compresses, bandages, first aid packets, plaster of paris bandages, etc., are put up here and sterilized ready for use. An extensive chemical laboratory is maintained for testing samples of the various supplies that are to be purchased. All suture materials are sterilized and put up ready for use, after first being tested to determine their tensile strength. Most of the employees of this depot are middle aged women who work for a moderate wage and who seem satisfied in knowing that they can secure steady employment at work which they are

able to perform, rendering at the same time a sort of patriotic service. A pharmaceutical department is also maintained and competent druggists are employed to compound standard medicinal preparations of all kinds that are issued to troops in garrison and in the field.

There is much work of a similar sort done at our medical supply depots and field supply depots. An important phase of the work conducted by the latter is the matter of medical issues to the Organized Militia. These are made from the Washington and St. Louis Field Supply Depots, and in one fiscal year supplies aggregating \$90,000, were distributed among the various state organizations. When we reflect that our chief dependence in case of an outbreak of hostilities will be upon the volunteer and state troops, we can understand how essential it is that they should be adequately furnished with the various medical supplies. If their sanitary troops are to profit from the summer encampments, there must be in their possession all the various articles that go to complete the equipment of Regimental Infirmarys, Ambulance Companies, and Field Hospitals. It is only by the use of these units that the personnel can become familiar with them. All state troops should be supplied with these units, properly proportioned to their numbers, and the state authorities should see that the necessary amount of time and instruction is given to make them reasonably proficient in handling this property.

The issue of supplies to troops in active service is accomplished by means of the Base Medical Supply Depot, and the Reserve Medical Supply. The former of these units is established at the base of operations and maintains an ample stock of medical and hospital supplies to meet all the requirements of troops and Medical Department organizations at the base,

on the line of communication, and at the front. The quantity of supplies to be kept on hand should be determined by the size of the field army, the character of the military operations, and the facilities for transportation.

For purposes of convenience and to facilitate the distribution of supplies, the regulations permit the establishment of branches of the Base Supply Depot near the front whenever the length of the line of communication would make issues from the Base impracticable. The advance branches are made by direction of the Chief Surgeon upon the approval of the Commanding General.

The base supply depots and their branches are to be designated according to the field army or other organization of which they are a part, with a suffix showing where they are located, as "Base Medical Supply Depot, 1st Field Army, Gettysburg, Pa."

All supplies for the base depot are obtained from home territory upon requisition of the officer in charge of the depot, who forwards copies through the Chief Surgeons of the line of communication, and field army, to the Surgeon General. In cases of emergency, however, the Chief Surgeon of the field army is authorized to order the immediate purchase of the necessary supplies. The responsibility for any deficiency in the articles on hand at the depot rests with the officer in charge of that unit. He is held directly responsible for any neglect or failure to initiate timely measures to replenish supplies. He is the accountable and responsible officer for all the supplies at the base depot and its advance branches, and is required to superintend all issues from both base and branch depots and to devise such measures as will hasten their distribution.

Issues are made directly from the base depot to troops and medical department organizations at



the base or on the line of communication on approved requisition received from the Chief Surgeon of the line. Issues are also made from the base depot or its advance branches to the Reserve Medical Supply (accompanying the supply train), the field hospitals, and ambulance companies, of the respective divisions. The Chief Surgeon of the line of communication in referring approved requisitions to the medical supply officer for issue, designates the depot, base, or branch, from which the issue is to be made.

Supplies for hospital ships and trains operating on the line of communication are drawn from the base depot, or if that is impracticable from a base hospital.

The Reserve Medical Supply is a movable depot, attached to a division of mobile troops, and ordinarily accompanies the supply train. These units are numbered from "1" upward in a single consecutive series for the entire military establishment. It is their function to furnish medical and hospital supplies to the organizations of the divisions which they respectively accompany. The officer in charge is required to make timely requisitions to provide against shortage and is held responsible for any deficiencies resulting from his neglect.

The Ambulance Companies and Field Hospitals, belonging as they do to the mobile divisional troops, ordinarily procure their supplies from the Reserve Medical Supply, but the Field Service Regulations permits them also to receive supplies direct from the advance branch of the base depot.

As there are but six wagons authorized to be attached to the Reserve Medical Supply, it is important that as far as possible the transportation of the various organizations at the front be used in obtaining medical supplies. The various regimental surgeons obtain supplies for their infirmaries and aid

stations upon requisition to the Chief Surgeon of the Division who directs the officer in charge of the Reserve Medical Supply to make the issues.

It will thus be seen that all the various medical department units along the line of communication are supplied from the base depot, or its advance branches, while all those belonging to the mobile division receive their supplies from the Reserve Medical Supply. In the case of the Ambulance Companies and Field Hospitals, however, they are authorized to receive their supplies from either source.

Certain supplies and materials, including litter supports necessary to fit up passenger or freight cars are contained in the field supply depots so that boats and trains can be quickly prepared to transport patients. The Chief Surgeon should make the necessary arrangements to have trains bringing wounded back to the base, carry supplies to the front. In like manner he should also make use of the wagons and ambulances belonging to the transport column to carry emergency supplies forward. Nothing definite has been worked out regarding the issue of medical supplies to the improvised hospitals which may be opened up in buildings near the battlefield or along the line of communication, but it is probable that the Red Cross organizations will have to be relied upon in a large measure for this service.

# The Internal Administration of a Base Hospital

By T. S. BRATTON

*Major, Medical Corps*

**B**EFORE taking up the internal administration of such a hospital, it is believed that a better understanding will be had if some general considerations relative to the establishment, size, scope, and functions of a base hospital be briefly reviewed first.

A base hospital is an establishment or unit of the medical department of the line of communications. It is under the immediate command of a medical officer and under the supervision and direction of the Chief Surgeon, Line of Communications.

They are established in the proportion of one to each division at the front, one or two being at the base and others at accessible and desirable locations along the line of communications. They will be numbered as pertaining to the field army, and when established will also be given a geographical suffix to locate them.

Suitable buildings should be used if available, but the conditions may be such that a tent hospital would be necessary.

The capacity of a base hospital as laid down by the Manual of the Medical Department is 500 beds, and the personnel is as follows:

*Twenty medical officers:*

One lieutenant colonel,                      Commanding.

One major,  
Eighteen captains and  
lieutenants.

Operating surgeon.

One executive officer.  
One quartermaster and commissary.  
One pathologist.  
One eye, ear, nose and throat specialist.  
Two assisting operating surgeons.  
Twelve ward surgeons.

*One dentist.*

*Eight sergeants first class:*

One general supervision.  
One in charge of office.  
One in charge of quartermaster and commissary supplies and records.  
One in charge of kitchen and mess.  
One in charge of detachment and detachment accounts.  
One in charge of patients' clothing and effects.  
One in charge of medical property and records.  
One in charge of dispensary.

*Sixteen sergeants.*

One in dispensary.  
Two in storerooms.  
One in mess and kitchen.  
Four in the office.  
Two in charge of police.  
Six wardmasters.

*Fourteen acting cooks.*

*One hundred and fifteen privates first class and privates.*

Sixty-eight ward attendants.  
One in dispensary.  
Two in operating room.  
One in laboratory.  
Fourteen in kitchen and mess.  
Six in storerooms.  
Four with transportation.  
Two orderlies.  
Four in the office.  
Twelve outside police.  
One assistant to dentist.

*Forty-six nurses, female.*

One chief nurse.  
One assistant to chief nurse.  
Forty-two in wards.  
Two in operating rooms.

Briefly stated, and quoting from the Manual of the Medical Department, the functions of the base hospital are "to receive patients from the field and evacuation hospitals as well as cases originating on the line of communications and at the base, and to give them definitive treatment." The definitive or final treatment of all cases at the base is of the greatest importance in preventing patients getting out of control of the Army authorities and back to their homes, where sympathetic friends, with false ideas of their duties to their country, will attempt to move Heaven and Earth to keep them at home, even after recovery. That this has been the case in past wars, and is more than likely to be the case again, one has only to read the records of it in Upton's Military Policy of the United States, or in the very complete article on Military Absenteeism in War, by Major Edward L. Munson, Medical Corps. Its great importance is my reason for referring to it in this connection.

It may then be said that an important function of a base hospital is to keep the patients with and under the immediate jurisdiction of the Army, to which they belong, until they have recovered, or until it is thoroughly established that their disabilities are permanent or such that the probable time of their recovery is so far distant that they will not be available for the war. In the latter event, of course, it would be to the advantage of the Army to have such cases back in home territory; and occasions may arise when the capacity of the base hospital is taxed, or an engagement is expected, and space will be needed for the freshly wounded, that many patients must, necessarily, be transferred to hospitals in home territory.

And, that the retained patients shall receive all proper care and treatment, base hospitals should be

so thoroughly equipped as to be able to carry every case, with few exceptions, to its conclusion. For this reason it would be particularly appropriate to place on duty those medical and surgical practitioners of world-wide reputation who so patriotically have offered their services in case of war, and are now enrolled on the Medical Reserve list, thus insuring to the wounded soldier the very best of medical and surgical attention that the country can produce.

As to the internal administration of a base hospital, the Manual for the Medical Department provides that "so far as adaptable, the regulations for general hospitals will govern the interior administration of base hospitals," and for all intents and purposes the administration of a general hospital is quite similar to that of a post hospital, only on a larger scale. Consequently the regulations of a post hospital should, with some amplification, enable the commanding officer to administer the base hospital.

To consider all the features of the internal administration of a base hospital as effected by Army Regulations, the Manual of the Medical Department and general orders would, however, carry us far beyond the proper limits of this thesis, and, therefore, an attempt will be made to mention only some of the more important ones and those that, from experience have impressed themselves as worthy of attention.

On opening the hospital, with its receiving ward, medical wards, surgical wards, operating pavilion, laboratory, mess hall, kitchen, administrative offices, barracks for the Hospital Corps, quarters for the female nurses, and, in a somewhat isolated location, a contagious disease ward, the commanding officer will assign the medical officers to their various duties as ward surgeon, operating surgeon, executive officer, and so on as provided in the above quoted list

from the Manual, bearing in mind the fitness of each for their respective duties.

He will, in like manner, assign the Hospital Corps.

If there are members of the Army Nurse Corps to do duty at the base hospital, he will direct the chief nurse to make such assignments in the wards and operating room as the conditions require and the experience of the nurses justify.

In devising a set of rules for the internal administration, the commanding officer could not do better than to adopt those laid down in the Manual for the Medical Department. While it is stated in the Manual that they "are merely suggestive, with a view of securing uniformity," it is believed their adoption should be obligatory. They are excellent, so far as they go, and as a matter of very great importance, such adoption by all hospitals would insure constant uniformity throughout the Army, so that when a man is trained at one hospital he will have little to re-learn at another. These rules are as follows:

#### GENERAL RULES

1. The senior noncommissioned officer will see that all men of the detachment and all patients in the hospital are always present or accounted for. Under the direction of the surgeon he is ordinarily in immediate charge of the hospital and Hospital Corps. He will require all members of the detachment to perform their duties quietly and treat the sick with gentleness and consideration. He will at once check any loud talking, whistling and singing, the use of obscene or profane language, or noisy demonstrations in or about the hospital.

2. A formal roll call will be held at reveille and at such other hours as may be designated. "Check" will be made at "taps."

All noncommissioned officers and privates of the detachment will be present at all formations and "check" unless specially excused. No ward will be left without proper attendance, and no member of the detachment will at any time leave the hospital bounds except by permission from proper authority, or, in the case of emergency, in the execution of duty.

3. The squad rooms will always be kept clean, neat and orderly.

4. Immediately after reveille each man will neatly fold his bedding, each article separately, and pile it at the head of his bunk, beneath the pillow. Beds will not be made down before 1:00 p.m., except in case of sickness or other necessity. All clean underclothing will be neatly folded and placed in the lockers, which will be uniformly packed; all other clothing will be brushed and hung in the closets, or in a specially designated place. Soiled clothing will be kept in the barrack bags. Shoes will be polished and placed on the floor of the closets, or at the foot of the bunks if there be no closets. Civilian clothes will not be kept in the squad rooms, but in the store-room, and will not be worn on pass unless special permission is obtained from the surgeon.

5. A card bearing the name of the soldier will be attached to his bunk and his accouterments will be hung, neatly and uniformly arranged, on the foot endiron of his bunk: (the Hospital Corps knife and belt will be kept in the locker.)

6. All bunks will be overhauled and cleaned each week, and, weather permitting, the bedding and mattresses, together with the other clothing, will be well shaken and hung out to air for at least two hours. Mattress covers will be changed immediately before each monthly inspection, or oftener if



necessary. Sheets and pillow cases will be changed at least once each week.

7. All public property in the possession of the men must be kept in good order, and all missing or damaged articles accounted for.

8. The men will pay the utmost attention to personal cleanliness; each will bathe at least once weekly, his hair must be kept short and his face shaved or beard neatly trimmed, and his under-clothing frequently changed. (See Army Regulations.)

9. Members of the detachment will wear the prescribed uniform at all times when present at the post. While on fatigue they may wear the fatigue dress. While on duty in wards, dispensaries, operating room, mess room or kitchens, they will wear the white uniform if obtainable.

10. All men on duty in the kitchen and mess room will arise at least one hour before reveille; all other members of the detachment (unless specifically excused) will arise at or before first call for reveille.

11. Breakfast will be served 15 minutes after reveille, dinner at 12:00 m., and supper at 5:00 p.m. All men go promptly to the mess room at the appointed time in proper dress.

12. Immediately after breakfast the hospital will be thoroughly policed in every department. It must be ready for inspection at 9:00 a.m., and always be kept absolutely clean.

13. All lamps in use must be cleaned, filled and made ready for lighting before the morning inspection. The filling of lamps after dark is prohibited.

14. The senior noncommissioned officer will keep an accurate account of all public property and its place of distribution. Each man in charge of a department of the hospital, as wardmaster, noncommissioned officer in charge of the mess, etc., is re-

sponsible for the public property used in his department; he will by frequent inventories assure himself of its presence.

15. A noncommissioned officer or other man, upon his assignment to a department of a hospital, will make himself familiar with the special orders governing it, and all must familiarize themselves with the standing orders of the hospital.

16. When necessary a noncommissioned officer in charge of quarters will be detailed daily by roster from noncommissioned officers on duty with the detachment, and an emergency squad will always be designated.

17. The noncommissioned officer in charge of quarters will go on duty at 9:15 a.m., and will be relieved by his successor at the same time the following day. In case of fire he will give the alarm and proceed as ordered in fire regulations. He will make an inspection of all wards and quarters at 11:00 p.m., will report all unauthorized absentees to the noncommissioned officer in charge of the detachment at reveille the following morning, and will see that all unauthorized lights are extinguished. Members of the detachment returning between the hours of 11:00 p.m. and 6:00 a.m. will report to him. He will be responsible for the efficient performance of the watchman's duties.

18. The noncommissioned officer in charge of quarters will answer night telephone calls and see that the proper medical officer is at once notified.

19. The night watchman, when one is necessary, will go on duty at 9:00 p.m. daily and remain on duty until relieved about 6:00 a.m. the following morning. During his tour of duty he will be under the immediate orders of the noncommissioned officer in charge of quarters when one is detailed, or of the senior noncommissioned officer at the hospital. He

will patrol the hospital grounds at least once every three hours and will be constantly on the alert for fires, lights and unauthorized persons in or about the hospital. He will at once report all unusual occurrences and violations of existing orders which come under his observation to the noncommissioned officer indicated.

20. Upon the sounding of an alarm of fire at the hospital all men of the detachment not actually engaged in subduing fire, rescuing patients, property, etc., will instantly assemble in the main hall of the hospital.

#### **Ward Rules**

1. The wardmaster is in charge of his ward and the assistants and patients in it. He will be obeyed and respected accordingly. He is responsible for the nursing, care, records and effects of his patients, the cleanliness and order of his ward, and the public property therein. Wards must be kept in order, thoroughly cleaned and aired daily, and frequently vacated for cleaning and disinfection.

2. No medicines or other medical supplies will be dispensed to any person except on the order of a medical officer, or, none being present and in an emergency, on the order of the senior noncommissioned officer of the Hospital Corps present, who will note the prescription and report the facts. Medicines prescribed for hospital patients will be administered by the wardmaster, and the containers kept in a locked closet.

3. Convalescent patients will arise at reveille and make up their beds before breakfast; they will perform such light duty about the hospital as may be directed.

All patients will retire at 9:00 p.m., at which hour the ward lights will be extinguished and talking must cease.

All other lights about the hospital except the authorized night lights will be extinguished at "taps."

4. Each patient's hands and face will be washed, ordinarily, before meals. Those unable to perform this service for themselves will be washed and bathed by the nurse on duty. They must always be kept clean in person and clothing.

5. Patients are prohibited from using towels, basins, toilet articles, eating utensils, or articles of clothing pertaining to another patient.

6. Bed linen will be changed on occupied beds at least twice weekly, and oftener if necessary to insure cleanliness. Whenever a bed is to be occupied by a new patient clean linen will be furnished. All bedding and clothing used by infective cases will when changed be at once disinfected. Patients will remove shoes and clothing, other than the ward clothing issued them, before occupying their beds. Any patient leaving his bed, to be away therefrom, will arrange his bedding in the prescribed manner of the ward. The nurse on duty in the wards will inspect the mosquito bars and see that they are properly arranged to exclude insects.

7. Smoking in the wards is prohibited, except when specifically prescribed for bedfast patients by the ward surgeon. In such special cases care must be taken to prevent the bedding from being set on fire. Patients permitted to use tobacco will do so only in those places designated for this purpose by the surgeon, and will be careful to deposit all burnt matches and cigar and cigarette stubs in the receptacles prepared for the same.

8. Visitors will be allowed to see friends in the ward at a specified time, when their presence will in no other way disturb other patients; but female visitors will not be permitted in the wards except

when cases are serious and then only by special permission of the surgeon.

9. No information regarding the condition or diseases of patients under treatment will be given to anyone except those authorized under the regulations to receive it.

10. Loud noise, boisterous actions and gambling are forbidden, and no food, intoxicants, or articles of any description, except as prescribed or authorized, will be brought into the wards.

11. Rounds will be made by the ward surgeon at 9:00 a.m., and at other times if necessary. At these hours patients will be in or at their beds.

12. When an officer enters the ward "Attention" will be called, whereupon those about the ward and able to do so will arise and stand at "attention," those lying in bed will cease reading or other occupation, and all conversation will stop.

Besides these rules, there are other important matters, such as the reception of patients, their care in the wards, care of patient's effects, mess management and the feeding of patients and personnel, the discharge of patients, disposal of their effects in case of death, and the hospital records—which, on account of their importance, are worthy of special mention.

#### **The Commanding Officer**

When possible he should be selected for his experience and known ability in hospital management. His duties should consist in a broad supervision of the entire hospital, constantly keeping in view the comfort and welfare of the patients entrusted to his care. And, to enable him to do this, all routine papers relating to the internal administration should be signed by his executive officer, thus giving him more time to supervise in a personal way the many

important matters that need his attention, from time to time, in the different departments of the hospital. As a particular duty, he should see every patient, immediately before he leaves the hospital, to assure himself that the patient has received every consideration that it is possible for the institution to give, and further, that he has no complaint that he might make after leaving the hospital, to the annoyance of everyone concerned.

#### **The Executive Officer**

This officer should be carefully selected, not only for ability, but as being personally acceptable to the commanding officer in the more or less close personal relations that necessarily must exist between the commanding officer and his right hand man. He should possess an aptitude for details, and while always affable, he should have sufficient determination of character to see that all hospital orders and instructions are promptly and efficiently obeyed. He should command the Hospital Corps detachment, acting in the same relation to it as a company commander; his duties as such are embodied in Article XXX of the Army Regulations.

#### **Admission of Patients**

Patients should be admitted to the hospital through the receiving ward. Here the transfer card, accompanying the patient, should be examined and verified, and the particular treatment ward called for by the nature of the injury or disease entered on the back of the card. The transfer card then becomes the warrant for the patient to enter the ward. If no transfer card accompanies the patient, then one should be made out at the receiving ward by entering on a register card the patient's name, rank,

and regiment or corps, and on the back the treatment ward to which his particular ailment determines his assignment. It should be the particular function of the medical officer of the day, with sufficient help from the Hospital Corps, to look after the requirements of the receiving ward. Patients should not be delayed in this place, and every effort should be made to hasten their transfer to the treatment ward, where they can be made comfortable and their diseases or injuries properly treated. And it may happen at times, on account of large numbers of patients being brought in at one time, that the functions of the receiving ward would have to be carried out in the treatment ward—rather than delay sick and suffering patients. In other words, we should hasten to give tired and suffering patients comfort and treatment first and obtain records later; for while the records are important, the sick soldier is more interested in a good, clean bed and the treatment of his wounds. And hospitals are established primarily to care for the sick and wounded soldiers—the records should be secondary.

#### **The Ward**

Before 9:00 o'clock the ward surgeon should be in his ward. He should daily give each patient careful and painstaking attention, noting down important clinical data on the treatment sheet and leaving carefully written notes of treatment for the nurses to follow. He should see that the wardmaster and his assistants are doing their work properly, especially in the matter of keeping bedridden patients clean and comfortable. Under no circumstances should neglect of this nature be tolerated. He will be careful to record his diagnosis on the transfer card and the treatment sheet, in accordance with the international table of nomenclature as given in the Man-

ual for the Medical Department, so that corrections of this nature will not have to be made in the record office.

The wardmaster should see that all patients, as they enter the wards, are given a good cleansing bath, provided with fresh, clean pajamas, and placed in clean, comfortable beds without unnecessary delay. The work expended on these details will be repaid an hundred fold in a feeling of cleanness, comfort and well-being of the patient—factors so essential to a proper response to treatment. Having placed the patient in bed, the wardmaster should now gather up his belongings, make a duplicate list, one of which is to be given to the patient, provisionally, the other to accompany the effects to the patient's storeroom. Here they are checked and another list made in duplicate, one to be retained and one given to the wardmaster who in turn gives it to the patient, taking up his own provisional receipt.

The patient's underwear, and his uniform, if of cotton olive drab, should be sent to the laundry by the noncommissioned officer in charge of the patients' storeroom, so that when he is returned to duty or is transferred, he has clean underclothes and a clean uniform to put on.

When female nurses are placed on duty in his ward, the wardmaster should give them every assistance and consideration in carrying out the ward surgeon's instructions, relative to the treatment of patients, and he should see that his assistants do likewise. The female nurse is a great asset, and has come to stay; and their use in base hospitals is particularly appropriate.

The wardmaster should see that the patient's effects are given to him upon discharge from the ward, and the storeroom receipt signed by the patient taken up and filed away for future reference. If



the patient should die, the effects should be disposed of as directed in paragraph 162, Army Regulations. And in this event, or in the event that the patient is transferred to home hospitals, the Government property which he brought with him should be taken up on the return of the commanding officer of the hospital and a receipt sent to the soldier's company commander and one to the department to which the property pertains.

#### **The Mess**

This should be under the immediate supervision and control of the quartermaster, who should be responsible for the contracting and payment of all accounts.

The mess sergeant should be selected for his abilities as a caterer, for a good mess depends on the person running it having those particular qualities some men have of being able to provide, to care for, and to see that food is properly prepared and served. Such a man having been found, the greatest part of mess-management difficulties have been overcome.

A sergeant who takes the proper interest in his mess will always be early at the local vegetable markets so that he can select from the best; and he will soon learn where he can procure the best values for his money. He should see that the food is so prepared by the cooks as to meet the requirements of the approved diet cards from the wards, and that those intrusted with the serving of food do it in a cleanly manner, not only in the matter of table service, but in their own persons—dining-room attendants on duty being always in clean white uniforms. He should also see that food sent into the wards is served in a cleanly and tempting manner.

When a diet kitchen is established, and placed in charge of a female dietist, he and his assistants should give her every assistance.

### **The Operating Room**

This room should have the very best and latest of equipment. The operating surgeon should be selected for his cool, clear judgment and operative skill. It is here especially that the many noted surgeons who are enrolled on the Medical Reserve List should be employed. The wounded soldier would have the best that the country could procure; and any request for sick leave on the ground of better surgical skill at home would be defeated at the outset.

The assistants, junior medical officers, Hospital Corps men and nurses of the female nurse corps should all be selected for their particular fitness for such work. Neatness, cleanliness and alert attention to details are all essentials in this department; and no lives should be jeopardized by stupidity, carelessness or indifference on the part of operating room assistants. Therefore, the very best personnel that the hospital can afford should be placed on duty here.

### **The Laboratory**

This department should be intrusted to a medical officer endowed with those especial qualities essential to good laboratory work; but he should constantly bear in mind that the laboratory is an important adjunct to the wards, and not allow his enthusiasm to run away with him to the extent of believing and acting on the belief that the balance of the hospital is a mere adjunct to the laboratory.

As the laboratory is maintained for the benefit of the sick in the hospital, examinations of material sent from the wards should receive prompt and careful attention, and a prompt report made, so that ward surgeons can be helped to an early and precise diagnosis. Therefore research work, always so fascinating to the laboratory man, should not be encouraged.

This department should do all the postmortem work and keep the necessary postmortem records.

#### **The Records**

The commanding officer is held responsible for the records of the hospital. He bears the same relation to the chief surgeon, line of communications, as the commanding officer of an evacuation hospital. He will, therefore, report daily on Form 83 "the number of patients fit for duty and the number of those who require transfers so that arrangements may be made accordingly."

The principal records that should be kept are laid down by paragraph 396, Manual for the Medical Department, and are as follows:

- Register of Sick and Wounded (Form 52.)
- Clinical Records (Form 55, 55-a and 55-b.)
- Prescription Files.
- Register of Dental Treatment (Form 79.)
- Medical History of the Post (Form 69.)
- Correspondence Book.
- Document File.
- Class Book of Instruction of the Hospital Corps.

The record of correspondence and the filing of documents will be in accordance with the usual post hospital system, as called for in General Orders No. 109, 1912.

Besides the above list, there are other and important papers that must be made at the proper time, such as:

- Muster and Pay Rolls.
- Return of the Hospital Corps.
- Sanitary Report.
- Statement of the Hospital Fund.
- Requisitions.
- Returns of Property, etc.

To keep all these records properly requires some considerable clerical ability and attention, and the

sergeant and his assistants detailed for this work should, above all considerations, be selected for their clerical ability alone.

If, in this outline of the internal administration of a base hospital, it has been shown that the principal object of those in charge of such hospitals should be to use every effort and adopt every means possible to the end that the greatest comfort and the best of medical and surgical treatment is given to the weary, sick and wounded soldiers intrusted to their care, who have given their health, limbs, and, in many instances, their lives to their country, then this tax on your patience has been justified.

# Reminiscences of Service in War With an Infantry Regiment

By THOMAS L. KIRKPATRICK

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**I**N April of 1898 the 24th Infantry entrained at Salt Lake City bound for the concentration camp at Chickamauga. As a body of officers and soldiers they left nothing that the most exacting of commanding officers could have desired in training, physique or military spirit. During the first week of September they landed at Montauk Point from the chartered transport *Nueces* depleted in number, entirely broken in health, but with a spirit still ready for any duty of which they were physically capable.

A few reminiscences of the sanitary service with the regiment during this period may not be amiss, and may help toward conclusions of value now.

A large part of that time was of the nature of a nightmare. But through it all runs the recollection of a spirit in those officers and men that met everything willingly and uncomplainingly, that was always ready to face new troubles and difficulties cheerfully. Oftentimes particularly trying situations would be robbed of the worst sting by some quaint phrase or remark that could come from no man on earth save a southern colored man.

Small-calibre bullets make a swishing, hissing sound like that given out by a small wire rapidly whirled around one's head. On striking any object, such as a twig, the vacuum at the base of the bullet is sharply closed with a snap such as is made by firing a boy's cap pistol. One feels sure that he is the target for explosive bullets of the worst form. Hear-

ing these sounds caused by hostile bullets for the first time, and hearing them in flocks is most disquieting, not to say distressing. Yet to have a man drawl out at such a time that: "About this time of day, my old Mother back at home is washin' clothes; I believe she'd like to have me there totin' water for her," has a diverting and soothing effect. Or when your first shrapnel sails toward you, making such sounds as a freight train makes when crossing an iron bridge, it helps mightily toward bringing you back to earth and the business in hand, to hear one of your men ask: "Henry, what was that we just passed?"

Another side of the spirit of these men was shown when yellow fever had gotten under good headway amongst our troops. The regiment was drawn up and told that men were needed to nurse yellow fever cases, and those who were willing to volunteer for this dangerous duty were asked to step one pace to the front. After the command of execution had been given, it seemed as if the whole regiment had simply dressed forward one pace.

The railroad trip to Chickamauga and the short stay there were of no sanitary interest. Moving on to Tampa the work of reorganizing the Medical Department for war service began. This reorganization consisted of breaking up regimental detachments, calling in tentage, ambulances and sanitary supplies, and combining the fragments into four "divisional hospitals" and two "ambulance trains." The need for this redistribution was ill understood by regimental medical officers, and was not at all felt by our regimental commanders. Hence, all possible resistance and delay was offered to a move which we considered sheer robbery. When it is considered that the whole subject of battlefield sanitation was covered by a scant page of the 1896 manual for the

Medical Department, this ignorance seems partly excusable.

The Chief Surgeon of the 1st Army Corps relates that this opposition in one regiment went to the point of entirely wiping out a detachment of 48 men. When the time for their transfer to divisional units arrived, the 48 Hospital Corps men disappeared, and it was explained that they had never belonged to the Hospital Corps at all, but were merely company bearers that had been detailed to the hospital for work and instruction.

At Tampa our opposition was not so vigorous, nor was it at all effective; and the detachment was soon reduced to its proper terms. Whereas we had been sheltering and treating even pneumonia and typhoid, our time was now occupied in discovering and ridding the regiment of its sick, making vaccinations, giving practical instruction in first aid, and in similar duties.

The circular under which the reorganization took place named one medical officer, one acting steward and one private as the minimum of sanitary troops to be retained with each regiment. Through some good luck or oversight the one acting steward and four privates brought from Fort Douglas remained with the regiment. All landed at Montauk Point with it save the noncommissioned officer, left in Cuba with yellow fever.

Of the sanitary preparation at Tampa, the work of instructing the line in first aid was probably second in the importance of its results to the formation of the field hospitals. The method followed with the 24th was the one so ably taught by Major John Van R. Hoff. The officers and band were early ordered to receive daily instruction. Diagnosis tags representing all ordinary lesions and emergencies were affixed to dummy wounded; dressing materials were provided and one or two bandsmen assigned to

the treatment of the case. The work was then done under the supervision of the Surgeon and the Hospital Corps men, and finally the Surgeon inspected each case, questioned the man as to the rationale of his treatment, and commented on and explained the reason for the method followed.

The officers witnessing the instruction passed it on to their companies. That the whole 5th Corps were well instructed in first aid is testified to by all who saw the results. Some have gone so far as to say that those who went dressed from the firing line to the homebound transports, without change of dressing at the field hospital, did far better than those who were dressed afresh at the hospital. As to this, however, it seems likely that no unnecessary meddling with good dressings was done at that hospital. The men were overwhelmed with legitimate work, and did not need to make more work by tampering with good dressings.

This expedition was apparently "marked for bad luck" from its inception. A bread-in-the-bone optimist would not think that we were enjoying all the comforts of home at Tampa. Yet we were getting three square meals daily, had a plenty of air that could be breathed with ease, water in abundance for drinking and semi-occasional baths, and we could plough through the sand when we felt like playing at taking a walk. All these advantages were ended about June 8th, when it is recorded that all the troops were aboard the transports. How this embarkation was premature is known to all. The "Phantom Fleet" appeared to someone in a disordered dream, and the sailing of the transports was postponed until the 14th. These six extra days aboard improvised transports no doubt helped toward the crippling of many stomachs, and the weakening of many good constitutions. The men were packed in three tiers



of improvised bunks in holds never intended for living freight. Some of these holds did not have even wind-sails to ventilate them. The bill-of-fare was hard bread, coffee, bacon, canned roast beef, canned baked beans, with rare issues of tomatoes. The diet is not bad for short periods, but serve it for 17 days in the tropics, to men housed in those holds; let the last 11 days be at sea, and the victims have had ill preparation for a fight in a tropical country.

Except as mentioned there was very little of interest during the sea voyage. Two buboes were enucleated with the transport rolling heavily. The Surgeon and assistants were seasick, so the patients were laid on litters resting on the deck, and the operating party sat tailor fashion about the litter. The patients were transferred at sea the next day to the hospital ship Olivette.

On arriving in front of Santiago first-aid packets were issued to two-thirds of the command, as there were not enough for all hands; and the regiment went ashore at Siboney on June 25th. By order of the regimental commander we took only such material as could be carried on the person. The corps order was so worded as to make it doubtful whether sanitary troops should go ashore at all at this time; but the interpretation of the regimental commander was more liberal. After rifling the medical and surgical chests of the most important articles, it cannot be said that the detachment went ashore empty handed; but our war paraphernalia were limited to litters and what pockets, corps pouches and haversacks could hold. In view of the lack of transportation ashore, perhaps it was just as well.

Our first camp site had just been vacated by a regular regiment and was in a polluted condition. The second site, occupied two days later, Sevilla, might have been one of those described by the Reed

Typhoid Commission, so far as pollution was concerned. No sinks appeared to have been dug and the bushes about the site were reeking with filth. Who these offenders were, whether regulars or volunteers, is not known.

At 3:00 p.m. of the 30th, we took the trail again, shifting camp to La Redonda, just east of Corps Headquarters. This march cannot be stretched on any map to more than  $1\frac{1}{2}$  miles. Yet such was the congested state of the road that it was long after dark before we made camp. A letter written the next day gives the time consumed as exactly six hours. Our rate of progress was hardly that made by a line passing a ticket window. This delay was caused by the fact that the road was a single one and very poor, and that just west of La Redonda it gave off an even worse trail to El Caney. Both crossed unbridged streams near La Redonda and artillery and infantry were being moved by them toward San Juan Hill and El Caney simultaneously. It does not seem that there could have been coördination as to the time of starting the several commands.

San Juan Heights consist of two ridges each a mile long, running north and south, about  $1\frac{1}{2}$  miles east of Santiago. The northern hill is  $\frac{1}{4}$  mile east of the southern one and overlaps it for about  $\frac{1}{4}$  mile. The northernmost of the two is known as San Juan Hill, and reaches a height of 125 feet toward its southern end. About  $\frac{1}{4}$  mile east of the south center of this hill is another elevation known as Little San Juan, or Kettle Hill. The San Juan River runs almost due south, skirting the east base of Kettle Hill, at a distance of  $\frac{1}{4}$  to  $\frac{1}{2}$  mile from San Juan Hill. These hills were occupied by about 1197 Spanish, according to Sargent's figures.

The only road by which this position could be

approached ran almost perpendicularly toward San Juan Hill from El Pozo for  $1\frac{1}{2}$  miles; curved toward the northwest shortly before crossing the San Juan River, and passed south of Kettle Hill about 400 yards away.

El Caney, 4 miles northeast of San Juan Hill, and 4 miles north of El Pozo, was held by about 520 Spanish.

The plan of the battle provided that Lawton's Division of about 6650 men should take El Caney while Kent's and Wheeler's Division of about 8400 took position at San Juan to the south and north of the road respectively. Lawton was then to swing to the west and join the other divisions in attacking San Juan. In the meantime Duffield's Brigade of two Michigan regiments was to attack Aguadores at the mouth of the San Juan River.

The only place where Kent's and Wheeler's troops could deploy was the line of the San Juan River; and before reaching this they had been under fire almost since leaving El Pozo. On reaching the river the losses became severe, and either a retreat or a charge was seen to be necessary. Some one has said that at this juncture a popular movement toward the Spanish position occurred. However that may be, the charge was ordered and the battle was on, without awaiting events at El Caney and Aguadores.

The 24th took the road shortly after 7:00 a.m., and though our camp was only  $2\frac{3}{4}$  miles from San Juan River, the gatling guns were firing some minutes before we reached it. Sargent states that these guns opened at 1:00 p.m. The same congestion that had delayed us the night before, held us now while under fire. A letter written during the earlier parts of this march speaks of short advances and long halts, and mentions that during the halts much deep profanity was heard. Later on, letter writing ceased,

and one of these halts was utilized for the writing of a last will and testament.

Wounded began drifting by when we were about  $\frac{1}{2}$  mile from camp. First came several Cubans who had been found by shrapnel at El Pozo, all severely hurt. These men were being carried in a sort of hammock slung from single poles which were borne on the shoulders by two bearers. The method is excellent for sick and for wounded without fractures, as the motion is easy for patient and bearers. Next came limping the present Color Sergeant of the 10th Cavalry, with what he took to be a simple hole through the leg. He said he had been dressed and needed nothing further. He recently stated that shortly after passing the 24th, his foot turned on a stone and his leg crumpled up under him. On uncovering it he found the bone sticking through the skin.

At El Pozo, one of our artillery positions, we passed a first aid station dressing wounded under a five-foot creek bank. After passing this point the procession of wounded increased, and it is worth noting that nearly all those on litters were borne by men from their own companies.

The last halt of the regiment occurred just before it reached San Juan River. Here a large group of wounded volunteers were found lying or sitting in the road, enfiladed from San Juan Hill at a distance of about 675 yards, with Kettle Hill about 450 yards off to the right. These wounded were dressed. Hospital Corps and some company litters were turned over to our band, who took them to the rear.

There is no record as to the number of this group. They may have been 20 or they may have been 50. Estimates as to numbers, or the flight of time after such events are apt to be hazy. At the time, about all that may be expected of a man is that his hands

will continue to perform acts in which they have been well trained. If the training of the hands has been faulty, there is no active mind to recognize the fault of execution. Hence the finding of guns in the old days, loaded to the muzzle with undischarged cartridges. This trait was shown here by a man with a canteen strap twisted about his thigh, under which his femoral artery was pumping away unimpeded. If the mind of the man who applied the strap had worked in the least degree, he would have known that canteen straps are worthless as tourniquets as soon as he had attempted to twist it, let alone when it failed to check the blood.

While we were attending these volunteers and a few of our own people who fell here, the regiment passed on, deployed, and took part in the final assault. The sanitary detachment lay a while in the road, then ran forward across an opening in the thicket, down a short by-bath and came out on the river. The right bank had been washed under and offered 4 or 5 feet protection. Under this a large number of wounded from several regiments were lying. Colonel Wikoff, who led our brigade into action lay dead close by. Colonel Worth, who succeeded Wikoff, lay here with a desperate looking fracture of the right arm and perforating wound of the breast. Colonel Lis-cum, who succeeded Worth, was dressed a few minutes later for gunshot fracture of the shoulder. All these cases, except the two colonels, had been efficiently dressed already. This point was about 200 yards down stream from the "Bloody Bend," where Newgarden did such notable service at his first aid station.

The open space between the river and the foot of the hill was now almost free from direct fire, and the detachment moved on toward the hill. Clumps of wounded men and officers of the 24th were lying

where any little swell in the ground afforded partial protection, nearly all of them well dressed with their first aid packets.

The detachment reached the hill in the neighborhood of 2:00 p.m., and established what was courteously called a first aid station. The name appears ridiculous in view of their empty hands and nearly empty pouches. But our welcome was hearty, and our presence seemed to give comfort to the line.

The vicinity of our firing line was already polluted, either by the Spaniards or by our own men.

After nightfall the Surgeon was sent back to the 1st Division Hospital in search of ambulances. Along the road strenuous work was being done by men from every company to get their wounded to the field hospital. There were few litters left, the work proceeding slowly and the weather threatened rain. Looking back, the road to the hospital seems to have held a constant procession of men taken from our firing line to act as litter bearers. There were three ambulances at work somewhere on the battlefield at this time, but none were seen on this road.

Only two of the four division hospitals organized at Tampa were put ashore in time to be used on July 1st. One was established at Siboney on the seacoast, eight miles from the front, and was used as a base hospital, absorbing other hospitals as they landed. The other, the 1st Division Hospital, was dumped ashore at Siboney on June 25th, with no transportation save four officers' mounts. By using these as pack animals and by making hand-barrows of their litters the men of this hospital moved it about 5½ miles to the west, where it was established across the road from Corps Headquarters. During the fighting this hospital did all the field hospital work for the Corps, handling 1374 wounded during the

first three days of July. Fully 1200 of these casualties occurred on the 1st.

At 8:00 p.m. long lines of wounded were lying about the tent flies, wherever grass could be found, and six surgeons were at work at combined dressing and operating tables. The Surgeon of the 24th was given a cup of coffee and some stew on entering the hospital, with orders to consume the food quickly and get to work at a table. As soon as man's dressing was finished a litter squad would remove him and a second squad would put another patient in the empty place. This stream of patients across the tables was unbroken until 5:00 a.m., when some of us went to sleep. At 7:30 we had a hasty breakfast, went back to work and the stream across the tables lasted with hardly a break until 8:00 p.m. The dressing began again in the morning of the third and lasted until noon. These were mostly belated wounded, brought in from the day before.

The mental attitude of the wounded, save the graver cases, was striking. They all seemed much elated, partly at the idea of going home soon, but chiefly by pride at having received a wound in war. The spirit of self-sacrifice toward each other was even more noticeable, one instance being this: a man with a gunshot fracture of the thigh was pointed out to a litter squad about noon of the 2d with the order to place him next on the table. He said, "You'd better attend to this man next to me, as he is bad off." On being asked how long he had been there himself without attention, the man of the fracture replied: "Oh, I got it about 8:00 last night, but I guess I got lost." He had been overlooked in the morning when it was reported that at present had been dressed; had lain sixteen hours on the ground without complaint; had seen wagonload after wagonload of wounded started to Siboney, and was still

willing to give up to another the turn at the table that would start him homeward. This spirit was common.

On returning to the front at 1:00 p.m. on the 3d the soil pollution about our trenches was found to have increased. The Spanish trenches had become especially so, as our men were using them as sinks. New sinks were dug at once at the foot of the hill throughout our brigade. The drinking water problem was seen to be grave, as canteens were being filled with raw river water by company details. As the periods of duty in the trenches became less strenuous, efforts were made to have all drinking water boiled. But as our utensils were limited to the tin cup and an occasional metal lining of an ammunition box, it is likely that much raw water was still drank.

This carelessness as to hygienic matters was not due to poor discipline nor to lack of instruction, for the discipline of this regiment was of the very best; and it was largely made up of old western campaigners, they were well instructed in field hygiene. It was due to indifference toward hygiene in the face of physical danger. Disregard of the commonest rules of health was common amongst officers as well as men, amongst regulars as well as volunteers. Officers were seen filling their canteens from the river with a dead mule lying in the water, in full view, not 50 yards upstream. The same thing was seen some months later in the Philippines—officers and men in active campaign filling their canteens from the Pasig. The calamitous results of this condition were made far worse on July 5th, when some 10,000 civilians were moved out of the disease-ridden town of Santiago and camped around El Caney, near the head of our watershed.

Until July 1st, and after the 3d, the use of mos-



quito bars was well observed, and nightly inspections were made by company officers to enforce their use. The knowledge of the mosquito's part in malaria was brand new and very impressive, and the well known gravity of Cuban malaria made it greatly feared. Yet without headnets and gloves between sundown and bedtime, there was ample time for all to be infected.

The regiment's service at the front ended July 15th, when it marched back to Siboney to act as guards, police and nurses at the base hospital until August 27th, when they embarked for Montauk Point. These duties were done in a way that added laurels that will never fade to those already won.

From the above rambling reminiscences the following conclusions are offered. Some of them are obvious and others are debatable.

1. The 5th Corps left the United States for campaign in a pestilential tropical country undermanned and poorly equipped for its sanitary work. All sanitary transportation save officers' mounts and three ambulances was abandoned at Tampa. Civilian shipmasters were allowed to put to sea with equipment of two field hospitals immediately after landing troops.

These conditions were due partly to the fact that an insufficient number of transports were assembled at Tampa, and largely to indifference toward the sanitary features of war.

It seems safe to prophesy that with this campaign in mind, the Army, as it is educated today will never again submit such a hopeless problem to its Medical Department.

2. 1374 wounded were dressed on the field during the fighting of July 1 to 3, most of these dressings being applied by riflemen. It is probable that between 1500 and 2000 rifles were laid aside at the

most critical stage of the fight while these dressings were being applied.

About 450 of these wounded required transportation to the field hospital, two and one-half miles to the rear; probably 400 of these were carried back on litters, each borne by four bearers. These 1600 litter bearers were 1600 rifles lost to the firing line either during combat, or during the night of July 1. At this time our position was so thinly held that General Shafter seriously proposed its abandonment.

An adequate medical personnel with its proper transportation would not only have saved much suffering, but would have added, by saving, great military strength to the line.

3. The modern allowance of sanitary troops to each regiment is 4 officers and 24 enlisted men. With this personnel distributed as outlined in the Manual for the Medical Department, each of the regiments at El Caney and San Juan Hill would have had 14 Hospital Corps men on its firing line, a total of 364 with the 26 regiments engaged. If the 1374 wounded had been equally distributed amongst the organizations, there would have been about 53 wounded in each regiment and each of the Hospital Corps men now allowed would have had about 37 wounded to dress and help, or to drag to a place of safety. Afterwards, about 450 would require transportation at least to the first aid station. It would not be safe to count on this litter bearing being done by anybody but the Hospital Corps men and the bandsmen. On this basis, each Hospital Corps man would have done a day's duty that would amply justify his existence. But the casualties did not run by averages, and the 16th Infantry had 115 wounded; the 6th 114; the 13th 91 and the 24th 83.

Hence, it is submitted that even for this fight which is spoken of as rather a minor affair (by those

who did not participate) the modern allowance of regimental sanitary troops would not have been excessive.

4. How should the sanitary troops on the firing line be distributed?

The distribution mentioned in Morrison and Munson seems well planned, and calculated to give excellent results. These writers assign a medical officer with his orderly, a sergeant and 4 privates to each battalion. This enables us to place a private with each company, the four being supervised by the officer and noncommissioned officer. This method was used in two fights in the Philippines in 1899. We had 3 officers, 3 noncommissioned officers and 9 privates. Each officer with a non-commissioned officer and 3 privates was permanently assigned to a battalion, and the enlisted men assigned one to each company. Both of these fights consisted in trying to catch a rapidly running enemy; no first aid station could be established, so all hands were put in on the firing line. The permanent assignment of officers and men to battalions and to companies promoted local attachments and sympathies, and the connection promoted pride in doing the work well. Moreover, it equalized the work, as the battalions rotated day by day in the character of their duties.

5. Should litters be carried by the firing line personnel?

Morrison and Munson speak of sending in 2 litters with each battalion. This point seems at least debatable. These men are going into action to do first aid and to help the wounded to protected places. They are expected to do their work with as little exposure to themselves as is compatible with good work. They must be free to move rapidly from place to place, and it is hardly probable that they will be able to keep together in pairs. Litters may

be desirable at times on the firing line, but they are not usually necessary there. It is difficult to drag them, and carrying them would enforce a more or less erect posture on the bearers. Carrying a man on a litter under fire would increase the danger to each of the three men concerned. It is not contemplated to move a wounded man under fire further than to the nearest position of reasonable safety, and such short movements can be effected without litters.

Hence, it is submitted that, save in situations where abandonment of a position is expected, litters would best be left with the first aid station party, to be used after the establishment of the first aid station.

6. The first aid station party according to the above scheme would consist of 1 medical officer with his orderly, 1 sergeant 1st class, the cook, the pack-mule driver, and the private most skilled in clerical work, and the bandsmen.

7. (a) The first aid station party in this fight would probably have halted at El Pozo. In no case should they advance during the early stages of combat beyond the point where deployment of the regiment is enforced; and if adequate cover is not available near this point, they should seek it to the rear.

On reaching the point selected for establishing the first station, the pack-mule should be unloaded and sent to the infirmary wagon for additional articles which should have been laid together for this purpose. Needed things are: another tent fly; more food, and G. I. buckets and kettles for heating water and cooking food. The medical stores consisting of beef extract, chocolate and malted milk will serve only for the more severely wounded. Your average wounded man will spurn these slops and yearn for hot coffee, hard bread, and a hot stew

composed of such trifles as corned beef, potatoes, onions, canned tomatoes and an occasional slice of bacon.

(b) Previous drill in first aid station work is of as great importance as drill anywhere else. It should include such essentials as rapid starting of fires, Travois construction and mule packing. Travois are usually spoken of as perfectly simple affairs, yet first attempts at improvising them are apt to turn out unsatisfactory apparatus. For good results, the shafts forward of the first cross-piece should be long enough to reach well up to the animals shoulders, or he is very apt to twist himself almost to the point of an upset. Many descriptions speak as if the shafts may be fastened to the side rings, or stirrup leathers of a saddle; but if no breast strap is provided, the saddle will soon be pulled back to the animal's rump.

The contrivance is apt to excite even steady draft animals when hitched to it the first time, and the pack-mule and infirmary wagon mules should all be broken and trained to its use.

Nearly all the materials of the regimental infirmary may be carried by pack-mule, and many think that they should altogether supplant wagons for this purpose. It is certain that in any war campaign there will be days, and maybe weeks, when no wagons but those bearing ammunition and rations will reach the troops. At such a time pack animals may be invaluable. For this reason the mules of the infirmary wagon should be trained also to carry a pack, and the regimental sanitary personnel be trained in using the ordinary pack saddle.

Much mystery has been thrown around the maneuver; but it all vanishes if small objects are used to represent the aparejo and the load, so that a bird's-eye view may be had of what is happening on

both sides at once. The back of a blank book with lower edges stiffened by strips of lath, and strings with a hook at one end to represent the cargo rope make sufficient apparatus for the demonstration. By using the modification of the diamond hitch devised by Major B. H. Dutcher, the procedure becomes as simple as tying up a box of candy.

(c) In the ordinary affairs of life the actual name of any particular thing is of no moment. But now and then we meet cases where a wrong name may lead to confusion as to the use of the thing in question, or may even lead to its perversion to entirely wrong uses.

The so-called "first aid station" is a case in point, as a vast deal of confusion has been caused by this name. All of our writings on this station show the evil effects of the misnomer. They either give a confused description of the work of the station, or else they make tacit apologies for, or explanations of the fact that *first aid* is really not rendered here, but at an entirely different place. First aid is given the wounded on the firing line itself by the sanitary troops with the battalions. "A formal regimental aid station cannot be established until the advance ceases, the engagement terminates, or night sets in." — (Straub.)

The true function of this station is to serve as a collecting point for the wounded, where further attention is given them after they have received first aid on the firing line. It is the first step taken in evacuating wounded to the rear, and its name should be descriptive of these two functions.

The point at stake is not a question of mere euphemy, but is exceedingly serious. The psychological effect of this improper name is to cause a strong tendency to make the functions of the station fit the name. After studying sanitary tactics and on pro-

ceeding to solve problems dealing with this station, medical officers and line officers almost always show a strong tendency to rush this station forward too soon, and thereby cripple its usefulness. This tendency is largely, if not chiefly due to the misleading effect of the name "first aid station."

If this effect is produced on the officer who has put in much time studying the subject, and working under the quiet conditions of home, what effect would it have on a regimental commander who has not studied the subject, in the turmoil of combat? On seeing his command suffering casualties, and seeing his "first aid station" party hanging back, he will inevitably order them forward at once.

It seems that the descriptive title "first aid" should be restricted to the sanitary parties with the battalions. A proper and descriptive name for the group we are now considering would be "regimental collecting station."

If the above reasoning is correct, it applies with almost equal force to the naming of the "dressing station."

8. Many argue from the fact that typhoid fever has been banished from the army, that future campaigns will not be attended by an unduly large sick report. If this sense of security should lead to a slackening of hygienic precautions, disaster might result, as this expectation of immunity from disease fails to take account of other epidemic diseases which prevail in war time. Epidemic dysentery, or bacillary dysentery is one of these, as it has in the past entirely disabled armies in the temperate zone. The germ of this disease is closely akin to that of typhoid fever, and its habits of growth, and mode of spread are similar.

Our several wars in the tropics and sub-tropics indicate that we cannot make war in these regions

without paying a heavy toll to disease. Figures published in the last Journal of the Military Service Institution show that of 100,454 sent to Mexico in 1846 and '48, 10,986 died of disease, and 12,252 were discharged for disability. It does not seem likely that even a majority of these casualties were caused by typhoid. Surely typhoid was not the greatest disabler of the Fifth Corps in Cuba, as the admission rate per 1,000 was only 58.01. In the Philippines in '99, with the lessons of '98 fresh in our minds, every possible effort toward sanitation was made, and typhoid was kept down to 68.21 per 1,000; yet after five months of active fighting the army was practically made up of sick men.

The armies following the sick armies in Cuba and in the Philippines had no such prevalence of diseases. Hence, it seems fair to conclude that active war, especially in the tropics, promotes the spread of epidemic diseases; and that there should be no relaxation in our fight against these diseases.



# The Hospital Ship—its Design, Equipment, and Administration

By JAMES S. WILSON

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IN SUBMITTING this paper it is believed that a preliminary remark might well be made, outlining the writer's ideas as to the functions of a hospital ship. These are:

1. Transportation of sick and wounded.
2. A stationary floating hospital.
3. Transport for medical supplies.
4. Transport for sanitary troops.
5. A floating hospital to accompany fleet of transports on an over-sea trip.

Of the functions just enumerated, the first is thought to be the most important—in fact, of more importance than all the rest combined, as it can only be performed by a suitably manned and equipped vessel.

It must be remembered that the hospital ship as usually employed is a specially devised means of transportation, and, not as generally supposed by the uninitiated, a base hospital, in the sense of being a place for extended and prolonged treatment of the seriously sick.

Preparatory to a brief discussion of the design of a hospital ship, the following specifications are presented as requisite if the vessel is to fulfill its function. They are as follows:

1. Safety.
2. Comfort for the sick.

3. Speed.
4. Steadiness in "heavy weather."
5. Suitable size.<sup>1</sup>
6. Sufficient bed space.
7. Proper ventilation.
8. Suitable situation for certain auxiliary appliances.
9. Quarters for sanitary personnel.
10. Provision especially adapted for loading and unloading sick.

Of the factors just mentioned the necessity of the first two are obvious.

The speed necessary for a hospital ship is not great. Twelve nautical miles per hour is thought sufficient, as a greater speed is apt to produce considerable motion in a moderately heavy sea unless the vessel is a large one; then, too, the lines for a ship capable of making great speed are usually those that result in a ship inclined to roll considerably in rough weather.

Steadiness is a very important requisite in a hospital ship, not only for the comfort of the sick, but an undue or unusual motion frequently interferes with the ordinary operating room procedure, or for that matter ward work, and occasionally, even in the steadiest of ships during a storm, only limited quantities of liquid food can be prepared and served and practically no expert treatment can be administered, and the ordinary routine of a hospital ashore is entirely prevented by the excessive motion of the vessel.

The size of the ship depends on many elements, but is in a great measure indicated by the personnel and the capacity officially prescribed.<sup>1</sup> It must be borne in mind, however, that a very large ship presents difficulties at a port in its "handling," and also that its great draught may require it to "lay off" some distance from the shore, thereby increasing the

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<sup>1</sup>Manual Medical Department, paragraph 588.

difficulty in the problem of loading and unloading. On the other hand, a small ship may be and usually is much less steady.

The question of bed space must be carefully considered; the minimum desired is, say in the neighborhood of 400 feet—an amount of bed space that is difficult and rarely obtained.

The ventilation is of greatest importance and can only be realized if one enters a ward in "heavy weather," when everything in the way of ordinary ventilating facilities are of necessity closed. The inadequacy of the steam driven fans alone for ventilation demonstrates the necessity of as much bed space as possible, particularly during the conditions just outlined.

With references to the so-called auxiliary appliances, many vessels can be found that will accommodate the prescribed number of sick (200) for a hospital ship, and carry them in comfort, but it must be remembered that in addition there are many appliances needed not carried by the ordinary passenger ship. A few of them are:

1. LAUNDRY.—The necessity of a laundry is obvious, and it might be stated that owing to the usual shortage of fresh water, that all laundry work when possible is done when in port on account of the facility of obtaining fresh water at that time.

2. CARBONATING PLANT.—While not a necessity this appliance is a great source of comfort to the sick, particularly in the tropics, for furnishing an abundant supply of carbonated water.

3. THE ELECTRIC PLANT.—The necessity of the generation of electricity for fans and lights is obvious, as well as for X-ray work, and the usually installed dynamo for ship's light will be found too small for the work required on a hospital ship. It will also be found that owing to the difficulty in the frequent

preparation of small quantities of food in the kitchen of the ship that electric stoves or "kitchenettes" will be found to be imperative in each ward.

4. AN X-RAY ROOM must also be provided with its accompanying dark room.

5. As the sick will in many instances be received from infected localities, or they themselves may be infected, a DISINFECTING CHAMBER for clothing and baggage is necessary. This appliance should be located on one of the upper decks and in an accessible position, preferably in the "after" part of the ship.

6. A suitable COLD-STORAGE PLANT is necessary, and if it also has in connection a small ice plant, the comfort of the sick is greatly increased, particularly in the tropics, by an abundance of ice.

7. The question of VENTILATION has already been spoken of and is accomplished in addition to the ordinary methods, as, for example, ports, ventilators, wind sails, etc., by a fan system, the air being forced by a steam driven fan through conduits of metal throughout the ship. The fans used on the "*Mis-souri*" were of this type and quite satisfactory, not only in delivery of fresh air between decks, but also that the temperature of the air delivered was controlled.

8. The installation of a DISPENSARY in a convenient location is suggested.

9. The OPERATING ROOM must be located with care on account of the necessity for suitable light and its accessibility from other parts of the ship, but it is believed that it will not be used as frequently as one would suppose.

10. QUARTERS FOR THE SANITARY PERSONNEL. — This matter may be overlooked, but is important, as the duties of the Hospital Corps are very arduous on a ship of this kind and suitable quarters ought to be

provided, even at the risk of inconvenience to the less seriously sick.

11. The **LOADING AND UNLOADING** of the ship is an important duty and requires in many instances considerable skill and judgment. It is accomplished by means of ship's boats towed by steam or gasoline launches, if the ship is not at a pier. The necessarily increased number of ship's boats and two or more steam launches require a suitable location, from which they can be readily swung in case of need.

12. An **ISOLATION WARD** must also be provided in the after part of the ship, preferably on an upper deck.

13. Suitable provision must also be provided for a **MORGUE**.

14. **ELEVATORS** for moving patients from deck to deck are almost a necessity.

#### **Design**

Having discussed in a general way some of the requisites of a hospital ship, it is assumed that the design of such a ship might be outlined approximately as follows:

*Hull.*—Steel or iron.

*Length.*—Three hundred feet.

*Beam.*—Thirty-five to 40 feet.

*Draught.*—About 20 feet.

*Size.*—About 4,000 tons.

*Speed.*—Ten to twelve knots per hour.

*Wards.*—Located for the most part on the upper decks, suitably ventilated, lighted by electricity, heated by steam, with 400 feet bed space if possible. Toilet arrangements for each ward. Electric fans and kitchens.

*Store rooms.*—On lower decks.

*Auxiliary appliances.*—In suitable locations.

*Quarters.*—Suitable quarters for the sanitary personnel to be located on a lower deck.

*Loading and unloading.*—Two or more "loading ports" to facilitate the loading and unloading of sick.

*Bilge keels.*—To steady ship in heavy weather.

*Wireless apparatus.*—

*Superstructure.*—As little as possible, to minimize "rolling."

In this connection it might be stated that the regular color of this ship is white, with a green strake for the ship belonging to the regular forces, and with a red strake if the ship is managed under the direction of one of the auxiliary aid or relief societies.<sup>1</sup>

### Equipment

Inasmuch as it is assumed that the equipment in detail of a hospital ship is not required in such a paper as this, it is thought that an easier and briefer statement might be submitted by a reference to one of the standard supply tables of the Medical Department.

On examination it is seen that the supplies listed for an evacuation hospital<sup>2</sup> seem nearest to fulfilling the necessary requirements for medicines, antiseptics, hospital stores, stationery, medical and surgical instruments and appliances, and miscellaneous articles, but in addition to these supplies provision must be made for the location and equipment of an operating room, X-ray room and adjoining dark room, laboratory, dispensary, laundry, carbonating plant, cold storage, refrigerating and electrical appliances, morgue and isolation ward.

In addition to the auxiliary appliances needed and referred to, special provision must be made for cots in the various wards. These are double tiered on uprights bolted to the decks and are practically the same type as furnished on the army transports,

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<sup>1</sup>Geneva Convention, Article 5.

<sup>2</sup>Manual Medical Department, paragraphs 847 to 854, incl.

except that they have removable side rails.<sup>1</sup> Springs for the bunks are not recommended except for special cases; this is not, however, in accordance with the views of most authorities. I believe the canvas bottom is sufficient and gives more comfort in "heavy weather" than a spring bottom bunk which materially increases the motion for the occupant.

The double tier bunk is objectionable, but is obligatory for various reasons, except in the case of a few small wards, as, for example, the officers' ward, surgical wards, and the infectious or isolation ward.

The bedding required will be that for 200 beds with a suitable mattress and pillows (one hair and one feather) for each berth with a sufficient extra number in case of loss, damage or destruction.

A point might be noted here that in addition to the ward furniture usually seen in a ward ashore, the addition of a small refrigerator to the ward is of great value, as the ship's refrigerator is not accessible as is the hospital refrigerator ashore.

There are several other items that add materially to the comfort of the sick and are usually furnished. They are deck chairs for the convalescents, and also a well-stocked library. The latter must be larger than one for a similar sized hospital ashore, as the writer has observed that the hospital ship libraries are patronized much more liberally than those of hospitals ashore.

#### Administration

The administration of a hospital ship, if compared, will be found to be very much similar to that of a small general hospital, with certain additions incident to its specific function.

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<sup>1</sup>Specifications Quartermaster General.

Reference will not be made to the general rules governing hospital ships,<sup>1</sup> as that subject is specifically treated in certain articles of the Geneva Convention, easily referred to in the numerous manuals issued by the War Department.

Nor in considering the administration will reference be made to the duties of the master of the ship or that of his subordinates in the deck, engineer or steward department.<sup>2</sup>

In outlining the administration, it might be well to enumerate the personnel<sup>3</sup>, which is as follows:

- 5 Medical officers.
- 5 Non-commissioned officers.
- 5 Cooks.
- 30 Privates or privates, 1st class. (29 nurses and 1 orderly.)

The duties and assignment of each of the personnel just given might be as follows, but it is readily understood that assignment is a purely provisional one and is dependent—particularly in the assignment of ward surgeons, wardmasters and nurses—on the number and character of the sick, the length of the trip, and the size of the wards.

#### The Commanding Officer:

Exercises general command and supervision of the ship and hospital under the Surgeon General and not local commanders. As in a general hospital, he assigns all duties and is assisted by one of the medical officers, designated as adjutant.

#### The duties of the Adjutant are:

1. Supervision of the record office and the prescribed papers. (Reports, returns and correspondence.)

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<sup>1</sup>Geneva Convention, Field Service Regulations, Army Regulations, and Manual Medical Department.

<sup>2</sup>New Army Transport Regulations, Quartermaster General.

<sup>3</sup>Manual Medical Department, paragraph 588.



2. Command of the ship in the temporary absence of the commanding officer.
3. Drill and instruction of the Hospital Corps.
4. Supervision of the preservation of records in case of fire, or in the case of "abandon ship."
5. In charge of patients' effects (clothing and money).
6. In charge of disinfecting plant.
7. Commanding officer of the Hospital Corps.
8. In charge of loading and unloading patients.
9. Summary court.
10. Preparation of routine orders, circulars and memoranda.
11. In charge of police of hospital portion of the ship, except the wards.
12. In charge of the Hospital Corps' and patients' mess, unless this duty is performed by the quartermaster.
13. Ward surgeon of the "convalescent sick" ward.

The Q. M. agent<sup>1</sup> now takes the place on transports of the quartermaster—it is assumed he will do so on hospital ships.

#### Ward Surgeons:

The three other medical officers are assigned to one or more wards each with the detail of one each for the following duties:

- a. Operating surgeon, if this duty is not performed by the commanding officer.
- b. Pathologist in charge of the laboratory.
- c. In charge of X-ray work, and recruiting officer.

#### Officer of the Day:

One of the medical officers just mentioned is detailed for this duty, which is entirely professional, as the commanding officer and the adjutant, neither of whom are available, are either one or both almost constantly on the ship to carry on all the administrative duties.

The noncommissioned officers are usually detailed as follows:

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<sup>1</sup>New Army Transport Regulations, Quartermaster General.

The senior is in charge of the record office and with him is usually the junior noncommissioned officer and two privates as clerks.

One noncommissioned officer is in charge of property and police, laundry, and assistant custodian of patients' effects.

One noncommissioned officer as first sergeant of the detachment, and as assistant in loading and unloading the sick, and noncommissioned officer in charge of the mess.

One noncommissioned officer in charge of the dispensary.

#### Cooks:

The five cooks are assigned for duty in the kitchen as ashore.

The remaining privates and privates 1st class are assigned to the wards as wardmasters and nurses. One man is required as mail orderly and messenger.

The question of supplementing the regular personnel by civilian nurses or members of the Army Nurse Corps is a frequent one, and in this connection it is believed that if it becomes necessary, the male nurses will prove more satisfactory, not because of superior ability, for such is not usually the case, but because no special provision in the matter of quarters and messing has to be made for them as in the case of the women nurses.

#### Disposal of the Dead

The disposal of the dead on board ship is either by burial at sea, or embalming and placing the body in a suitable coffin. The quartermaster usually furnishes a qualified embalmer for this work.

In conclusion, I would state that the paucity of available literature on the hospital ship necessitated

my falling back for data for this paper almost entirely on casual observations of the hospital ships "*Relief*" and "*Aid*," and my experience during a short tour as subaltern on the hospital ship "*Missouri*."

# A Critical Review of Improvised Methods for Litter and Wheel Transportation of Wounded in the Field

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THE subject of the transportation of the wounded has been a matter of serious consideration from the time of the beginning of organized warfare. Never has there been adequate provision for the movement of the wounded, and improvisation has always been necessary. At the present day the sanitary organizations of the armies of civilized nations have been so much improved and the equipment so much increased that the condition of the wounded will be materially ameliorated. But there is much to be done yet.

In the study of improvisations for the wounded, due consideration must be given to the number of these devices required as affecting the supply of material, and the time element as affecting the collection of material and method of construction.

For purposes of discussion it will be convenient to classify these improvisations according to these requirements as—single and multiple—immediate and mediate.

In determining the efficiency of a device for transportation of the wounded, not only must the protection, comfort, and safety of the individual patient be given due weight, but, also, must be con-

sidered the quantity of material, transportation (bearers or tractors), attendance, time and ease of construction required, as well as durability, weight, effect upon the transportation factor and the length of time and character of terrain over which it is to be employed. In multiple immediate improvisations a considerable amount of comfort of the individual must be sacrificed to permit economy in the other factors which will admit of their application to the many patients. Single improvisations for individuals offer little difficulty because there is, either near civilization or in the wilderness, abundant means at hand for improvised devices, and the element of time plays little part.

Many wounded present demands for so much material, traction and attendance, and time is such an important factor in the problems of military evacuation that the subject merits serious investigation.

Organized preparation can be made for the transportation of a considerable number of wounded; but the burden of special equipment for the care and evacuation of all the wounded of a battle would immobilize an army. Personal attendance the wounded can get, but means of evacuation for a great number must be in great part improvised.

The necessities of warfare place even the armies of the most civilized nations, at times, under conditions as primitive as were those at the dawn of the world, and no means for the transportation of the wounded can today be considered archaic. Under special conditions the sling and head band of the savage porter may have a greater value as an improvised method of transportation than the best car ever evolved from a Pullman shop.

Improvisations for the movement of wounded must be chosen and made with special regard to the

conditions of use and materials available. Various improvisations have been offered and used for or in place of hand litters. Of these the simplest is—

**THE PICK-A-BACK SLING**, made of a sarong, scarf, sash or belts passed across the forehead or shoulder or across the shoulders and chest knapsack fashion of the bearer and under the buttocks of the patient, who is carried pick-a-back. This method can be used satisfactorily only with conscious cases of slight gravity which can assist in retaining themselves in position and is contraindicated in fractures of the trunk and limbs.

This sling has its chief use in immediate single or multiple evacuations for short hauls. It is particularly indicated for short hauls in mountainous regions where the litter cannot be used. Even with trained porters this method is exhausting to both carrier and patient and requires frequent reliefs. For this reason it is uneconomical in bearers, and except as a means of emergency transportation in default of others, is of little value.

American troops have no articles of equipment readily convertible into slings. The Swiss Alpine chasseurs are given special training in this method of evacuation.

**THE SINGLE POLE LITTER-SUSPENDED HAMMOCK** consists in its simplest form of a long, relatively elastic pole to which the patient is lashed by a sarong, or by cloth strips or netting bands, leaving ample free space at the ends for the bearers, of which four or more are usually required. In its more elaborate form a hammock or litter is suspended from the pole with various forms of canopy. By close suspension or lashing this form of transportation can be used in mountain work. Its use is more or less restricted, except in localities where bamboo is found, by difficulty in procuring a sufficiently strong and light pole.

For transportation of single cases with plenty of bearers a hammock improvised of blankets, tentage or cords makes an excellent litter.

For immediate multiple evacuations it cannot be applied, owing to the difficulty of getting proper material and sufficient bearers. At best it is uneconomical except where coolies or trained porters are available. The single pole with close suspension is used by the Moros in Mindanao. The suspended hammock is much used as a means of personal transportation in Africa and the Orient.

**THE DRAG AND SLED.**—These have a limited range of use and are restricted to conditions where transportation over snow or ice or infrequently over extensive marshes and grassy plains is required.

Over crusted snow and ice the patient may be placed on a drag consisting, in its simplest form, of a large boughy branch, preferably of a conifer, with traction at the proximal end, or upon a hide, hair down, pointed to the rear—or upon a slab of bark forming a primitive toboggan.

The sled or drag with greased runners may be required over extensive marshes where wheels would sink and may be used over grassy plains.

On ice or snow the drag is an excellent improvisation for immediate, mediate, multiple or single cases. Given a forest at hand the device can be quickly arranged and for short hauls can be well handled by a single bearer. For long hauls more bearers will be required or an animal used, in which case a travois or sledge could be better substituted.

The sledge on grass or marsh requires a considerable number of tractors and is consequently not so efficient and best adapted to the single mediate case.

**THE PREPARED SADDLE.**—This device, consisting of a saddle prepared with large pommel and

cantle rolls and bows of bent green wood padded and fastened at the ends to the pommel and cantle rings and lashed together sawhorse fashion, has been proposed and used at various times to some advantage for horse transportation of cases of disability or exhaustion from wounds. Its use is limited to conscious cases not greatly disabled and contraindicated in fractures of the lower limbs.

For rapid evacuation of special cases where other means are not at hand it has some value, but it cannot be considered as a substitute for the litter or travois.

**THE DOUBLE PANNIER OR CHAIR.**—Consisting of panniers, bags, or ordinary chairs lashed in pairs to the saddle or aparejo, has a very limited use on account of the necessity for special animals, special materials and special packers. At best this device is insecure and uncomfortable and restricted to a certain class of patients—those suffering from exhaustion and minor wounds.

It may be used in mountainous regions for single and multiple cases for short hauls, and, in default of wheel transportation, is more economical than any other form of animal transportation except the double pack saddle litter.

**THE IMPROVISED PACK SADDLE LITTER.**—With the best litters and best packers obtainable single litters or litters lashed in pairs to pack saddle or aparejo are insecure and uncomfortable, owing to the very considerable movement of the animals under the pack, and this method of transport can be used to little advantage except when other means are not at hand. It will be more difficult to properly secure an improvised litter, unsubstantial as they usually are. The Daly pack saddle, specially made for use with the standard litter, seems a well made device, but this cannot of itself mitigate the excessive move-



ment of the pack. An improvised pack with standard litter was used at Bud Dajo in Jolo for a considerable number of patients.

THE MULE LITTER in its simplest form, two long poles forming thills for an animal at the front and rear with traverse bars at the centers supporting a litter bed or chair, or in its more elaborate form the horse palanquin of the Orient, has been in use since the beginning of history.

It is the best substitute for wheel transportation or the hand litter devised and can be used over distances and road conditions impossible for the hand litter and wheels. Where animals and material are available, it will be found a most excellent and comfortable means of transportation for the wounded. But for multiple immediate evacuation it is uneconomical and unavailable.

THE TRAVOIS in its improved form consists of two poles, preferably sixteen or eighteen feet long, of sufficient rigidity to support the patient, fastened together with two cross bars of sufficient length and strength to form the head and foot supports for the litter beds made of canvas, sacking, netting, rope or withes. The heavy ends of the poles form the thills—supported by stirrup straps and secured to the animal by a surcingle used as a breast strap.

The travois gives efficient transportation over considerable distances. It requires only one attendant and animal and under ordinary conditions of terrain is durable and not excessively exhausting to animal or patient. Major Reno calls attention to the considerable wear of the shoes on the perfected travois and finds the use of a wooden shoe necessary from time to time.

Of all means for litter transportation of cases, this is the most efficient and economical as to animals, attendance, materials and construction.

Given a forest to furnish the wood, the mounted sanitary soldier can find in his equipment bandages, straps or cords for the lashings, and his shelter-half or blanket for the litter bed and with his mount and equipment a means of traction. As pointed out by Major Reno, the ambulance mules furnish harness and animals for use of travois in advance of the dressing stations when wheeled transportation can not be used,—giving marked economy in bearers and more rapid and less exhausting evacuation.

The travois must be the solution for the transportation of helpless wounded of mounted commands where wheeled transportation is not available and stands next to wheeled transportation in efficiency and economy under ordinary conditions. It may be used over trails impossible for wheels. On account of ease of construction, loading and unloading, it can be used advantageously for either long or short hauls.

**THE WHEELED TRAVOIS OR LITTER** as an improvisation will not be considered, because only rarely are there at hand wheels of the proper size to permit of its construction. During the Russo-Japanese war the jinrikisha with a litter platform in place of the body was used to advantage by the Japanese. Our own barrack cart with tailgate closed easily takes one litter with stirrup supports clamping against the front and tailgate. It moves easily over level ground with one bearer.

**THE HAND LITTER AND CHAIR.**—This has been used in many forms from the shoulder litter, carried usually by four or more men, a true palanquin, to the improvised device of two rifles rolled within the ends of a blanket to form the bed and side bars.

The essentials for the construction of a hand litter must be two bars of sufficient length to form the supports for the bed and to give hand holds for

the bearers. The bed must ordinarily be at least six feet long for comfort, and with two bearers between the bars the handles must extend at least nine inches beyond to give proper clearance. For the two-bearer litter cross bars are advantageous.

Lightness and strength must be the chief considerations.

Litters can be speedily improvised when saplings or timbers are at hand, using bandages, belts, wire or rope for lashing and blankets or shelter-halves for the bed. In place of these grain sacks with holes cut in the closed corners threaded on poles, wire netting, or rope or fence wire woven on the frame and padded with straw can be used, or buttoned coats with sleeves inturned and threaded on the poles.

For the care of the single case some of these means will almost always be available and an efficient litter can usually be constructed. As such it forms the most comfortable means of transportation for the wounded. Carried by four bearers with proper reliefs, it can be used over terrain impracticable for wheel transportation or animals, and over considerable distances, but at the expense of the exhaustion of a considerable number of bearers.

Under ordinary conditions the improvised hand litter or any bearer litter is unsatisfactory except for short hauls.

For evacuation in front of the dressing stations some type of hand litter is necessary, and, should the regulation litters be deficient in number, improvisation will be required. Under battle conditions it will be rare that suitable material will be found near or on the field in sufficient quantities to construct many improvised litters. This situation would lead us to the examination of the equipment of the soldier for material for an improvised litter. And it will be

found that by the use of two rifles and the shelter-half or blanket the well-known blanket litter can be improvised. A litter very uncomfortable for the patient and bearers, inefficient for even short distances, but always available and known to the line soldier who will be the constructor and bearer—on this must we depend at present for immediate multiple improvisation in fault of a better. The shortened rifle and the sharpened bayonet and the new form of the shelter-half have rendered the blanket litter less efficient, and the packs stacked at some distance to the rear of the firing line, together with the disuse of the coat in favor of the sweater, have rendered it or the coat litter less available; yet it is believed that the rifle-blanket—shelter-half—sweater litter must be depended upon for immediate multiple improvisations for short hauls on the battlefield.

#### **Improved Methods of Wheel Transportation**

**THE BICYCLE AND MOTOR-BICYCLE COUPLED.**—Various elaborate devices have been devised for coupling bicycles in pairs with a litter suspended between them, and plans for improvised coupling frames have been devised, using poles and wire as the material. It is not believed that an improvised coupling is practicable on account of difficulties in collecting material, construction and time required.

**MOTORCYCLE WITH SIDE CAR.**—The motorcycle side car can be quickly arranged with a litter platform from rough wood and lashing material—or the side car without change used. On good roads this device is exceptionally efficient for the immediate single case. Sufficient motorcycles and side cars will not be at hand for multiple evacuations.

**CARRIAGES AND PLEASURE VEHICLES.**—These can be procured to a considerable number in most

civilized countries and make excellent improvisations for transportation of the sitting—and may be arranged for one or more litters by lashing a suitable litter frame in proper place. In default of animals or harness these vehicles can be used attached to other vehicles or motors as tractors. They can be used as single or multiple immediate improvisations.

**FIELD (MILITARY) AND FARM WAGONS.**—The military field wagon and the farm wagon are so similar in dimensions and type that they can be grouped together so far as capacity is concerned. The field wagon empty will carry seven sitting passengers or four lying and one sitting passenger beside the driver. For this large number the wagon bed must be filled with hay or like material to furnish a seat or bed for the sitting or reclining cases—and to mitigate the jar caused by the inequalities of the roads. For single cases the device of suspending the litter from the wagon bow, described by Major Wilson, seems particularly advantageous.

The farm or work wagon forms the most numerous of civil vehicles, and, while relatively uncomfortable from a medical standpoint, yet from the view of military necessity is the most available and impressable under ordinary conditions, and, together with the empty wagons of the supply trains, will be more greatly used to evacuate those disabled wounded who are in excess of the capacity of the organized transport columns. The hay rack on the farm wagon materially increases its capacity.

With untrained drivers and two-line teams the farm wagon will not have the radius of action, endurance and speed of the four-line team of the field wagon and must, therefore, be organized in separate companies with sufficient trained military personnel to keep them to their duty.

The farm wagon without animals can be used to

advantage in trains drawn by an agricultural tractor engine.

**THE DELIVERY WAGON AND VAN.**—These may be available in small numbers and can be used according to their capacity for the single patient or for small groups of patients or incorporated in the civil companies. The delivery wagon, usually a heavy spring wagon, can be most advantageously and economically used with the trains of spring vehicles for rapid movement of sitting cases, while the van is only available on good roads and should move with the heavy transportation.

These trains of heavy and light wagons are ordinarily limited in their march to fifteen or twenty miles per diem, or under exceptional circumstances to twenty-five or thirty miles for one day.

**AUTOMOBILES.**—Under present conditions automobiles will be found in American communities in the proportion of one automobile to each eighty inhabitants. These are distributed approximately as follows: Two-passenger cars, 30 per cent; five-passenger cars, 50 per cent; commercial cars, 20 per cent.

The passenger cars can be used unaltered for the transportation of sitting cases and for this purpose, under ordinary circumstances, are excellent.

The five or more passenger car is the most economical and efficient for this purpose. The touring car can be used in an emergency by lashing a litter frame for two litters to the iron brackets supporting the top and at slow speed will render efficient service. High speeds cause too much movement to be safe.

Mediate multiple improvisations can be made by removing the body and bolting a light frame to the chassis, which can be best arranged to take two litters tiered and three sitting patients. It would

seem that with certain automobile manufacturers turning out some thousands of cars per month, mediate extemporization of motor ambulances could be provided for to the extent of some thousands per month.

Immediate extemporization of commercial cars to carry two recumbent and three or more sitting cases can be made within two minutes and by cross bars and loops within thirty minutes using the 1,500 pounds commercial car as a type.

The chassis of this car can easily have a wooden body constructed to give the same capacity and arrangement as our present horse ambulance.

Commercial motors of more than 1,500 pounds' capacity are unsatisfactory on account of excessive weight unadapted to country roads, culverts and bridges.

The defects of the improvised motor ambulance are unreliability in soft roads and deep snows. But their high speed and large radius of action, together with capacity and comfort and indefatigability render them ideal for this purpose. Under favorable conditions the improvised motor ambulance will be found the best means of evacuation from field hospitals.

In addition to use as carriers, these cars can also serve as tractors for disabled motors or horse vehicles.

It would not seem inadvisable for the War Department to select a definite type of car as a standard and assemble sufficient equipment of standardized ambulance bodies to permit mediate improvisation of several sections of six cars each for use with transport columns or ambulance companies.

TRACTORS.—Various types of steam and petroleum tractors are found in agricultural communities which will be available for use with farm or other wagons as carriers of wounded. Their speed will usually be greater than that of a wagon train and average

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capacity six or eight wagons. Under ordinary road and weather conditions these can be used to advantage for long hauls. On account of their weight they tend to damage roads and culverts and care must be taken that a line of medical evacuation is not materially affected by their road destroying action.

#### **Railway Wheel Transportation** **Improvised Hospital Cars**

**FLAT AND BOX CARS 8½x36 TO 40 FEET.**—For short distances in temperate weather flat cars may be extemporized without change or addition for sitting patients, and by placing them backs to the sides will carry forty patients comfortably. Straw on floors improves the conditions much.

These uncovered cars may also be used for recumbents, capacity twenty to twenty-five under like conditions, straw, cots or litters used as beds. As the patients will be exposed to sun, wind, weather and cinders, care must be taken where possible to use tarpaulins as a covering—and to guard against fire by furnishing water in sufficient quantities.

The box car, with sufficient openings for ventilation and the ends screened to exclude cinders, can be used as are the flat cars for immediate multiple evacuations in temperate weather and have the same capacity for sitting or for recumbents bedded with straw, cots or litters.

Various devices have been proposed and used to increase the capacity and comfort of box cars improvised as hospital cars by introducing frames to support tiered cots or litters with spring suspension.

For mediate multiple improvisations such devices of which the Beck system is an example have a considerable value, but the difficulty will be to have them at hand when necessary. A method, such as



is credited by Major Ford to the Panama Railway, in which litters are permanently attached in tiers to freight cars and when not set up lie against the walls of freight cars, would be particularly advantageous on supply cars attached to the lines of communication.

The freight cars have many disadvantages by reason of difficulty of communication en route, absence of toilet facilities, liability to jolts and jars and absence of heating facilities; but by reason of their frequency in considerable numbers on all railroads, the fact that they are constantly available at military railway supply points moving toward the base empty, they must be considered valuable aids in the evacuation of the sick and wounded, and under almost all field conditions will furnish greater comfort and shelter than can be found in the open.

Passenger and sleeping cars lacking, the freight car must be used for evacuation and the lack of heating and toilet facilities can be mitigated by installing tent stoves and commode sets or simpler devices.

**DAY COACHES AND BAGGAGE CARS.**—Day coaches can be well used without alteration for sitting cases in the proportion of one patient to a seat or the seats removed, used for recumbents. In emergency a considerable number of litter cases can be accommodated by placing litters on seat backs. Whenever day coaches are made up in trains one or more baggage cars are required to take over sitting cases that may become recumbents.

**TOURIST, STANDARD AND COMPARTMENT SLEEPING CARS.**—These require no changes for immediate use and furnish ample toilet and storage facilities.

Detachments can take over these cars and require nothing over car equipment other than ordinary medical equipment and bedpans and urinals—and these can be easily improvised. Given a train of

standard or tourist sleeping cars, one dining car and one baggage car, an excellent improvised hospital train can be arranged to accommodate 200 patients.

The addition to the car equipments of an improvised operating table, medical and surgical chests, and bedpans and urinals will give all matériel required for immediate use.

STREET CARS, CITY AND INTERURBAN LINES, depending on type and size, will be more or less valuable for short hauls.

Without change they can be used for sitting cases or with recumbents on litters placed on seats or seat backs. With seat removed, recumbents can be bedded on straw, cots or litters. Their speed, under power, relatively comfortable running, and capacity render them much more efficient for long hauls than animal-drawn or auto transportation.

It will be rare that the position of the wounded and street railway lines will be coincident, but when this occurs the railway cars can be used to advantage.

#### Conclusions

1. The most efficient and fairly universally adapted improvised hand litter for immediate multiple evacuation of the wounded is the litter composed of a shelter-half rolled upon two poles and tied with cross bars at the head and foot and to act as spreaders.

2. The least efficient and most universally adaptable improvised hand litter is the rifle shelter-half or blanket litter.

3. The most efficient and universally adaptable animal transport is the travois.

4. The most efficient, abundant, and universally adaptable improvised wheel transport for the recumbent and sitting wounded is the straw bedded field wagon.

5. The most efficient improvised wheel transport for sitting cases is the touring car.

6. The most efficient, abundant, and universally adaptable railway car for improvised transport of the wounded is the box car.

7. The most efficient and immediately convertible improvised transportation for the wounded is a train consisting of one baggage car (operating room, dressing room, dispensary, office), one combined kitchen and dining car, and six 14-section tourist or standard Pullman sleepers, all with regulation Pullman equipment.



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